SYSTEMS INTEGRATION VENDOR ISSUES

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INPUT OFFICES

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San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300 Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
Tel. (201) 801-0050 Fax (201) 801-0441

Washington, D.C.
INPUT, INC.
1953 Gallows Road, Suite 560
Vienna, VA 22182
Tel. (703) 847-6870 Fax (703) 847-6872

International

London
INPUT LTD.
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

Paris
INPUT SARL
24, avenue du Recteur Poincaré
75016 Paris, France
Tel. (1) 46 47 65 65 Fax (1) 46 47 69 50

Frankfurt
INPUT LTD.
Sudetenstrasse 9
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Tel. 0 6447-7229 Fax 0 6447-7327

Tokyo
INPUT KK
Saida Building, 4-6
Kanda Sakuma-cho, Chiyoda-ku
Tokyo 101, Japan
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Researched by
INPUT
Piccadilly House
33/37 Regent Street,
London SW1Y 4NF
England

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Abstract

This report examines the European systems integration market from a vendor point of view, identifying and commenting on the major challenges that face systems integration vendors. Major systems integration projects are few in number and competition for them is intense. This report discusses vendor strategies in targeting the systems integration market and the strengths and weaknesses of the major categories of vendor. Both bidding for and executing systems integration projects carries a considerable risk, and vendor approaches to reducing these risks are discussed. Alliances are also becoming a critical success factor in the systems integration market and the report considers the ways in which the nature of these alliances is evolving.

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Table of Contents

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Table of Contents (Continued)

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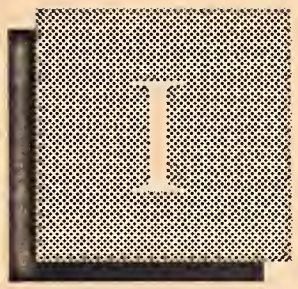
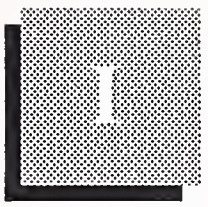


Introduction



Introduction

A Objectives

The objective of this report is the examination of the issues facing systems integration vendors in the 1990s within Western Europe. The systems integration market is continuing to demonstrate strong growth within an overall environment for software and services that is experiencing some difficulties. Not only is the overall economic environment in a state of considerable uncertainty within Europe, but the entire computer industry is experiencing problems associated with equipment downsizing and the growing acceptance of open systems.

Systems integration projects are comparatively scarce and competition is considerable. Because of the projects' complex nature, all vendors require partners in implementing systems integration projects. The projects themselves carry a high financial risk and a number of vendors have suffered considerable losses.

In response to these issues, the principal objectives of this report are to identify:

- The driving forces leading to systems integration projects and the major reasons why users choose to outsource such projects;
- The key players in the buying process;
- The major sources of risk in systems integration projects and the steps vendors can take to minimise these;
- The major trends in vendors' use of alliances to gain access to key decision makers and to fill gaps in their capability;
- Vendors' strengths and weaknesses and the generic strategies they could adopt.

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B

Scope

Systems integration is a business offering that provides a complete solution to a complex information system, networking or automation requirement through custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Programme management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- Systems component selection, modification, integration and customisation
- Custom software design and development
- Custom hardware design and development
- Systems implementation—including testing, conversion and post-implementation evaluation and tuning
- Life-cycle support, including
  - Systems documentation and user training
  - Systems integration during development
  - Systems maintenance

Exhibit I-1 positions systems integration within the overall information services market. It can be seen that the systems integration market is divided into four submodes. This sector thus includes equipment products and software products—in addition to the professional services for software development and project management that represent the most important value-added aspects of the systems integration sector. The fourth submode would include activities such as processing services provided within the overall context of a systems integration contract.

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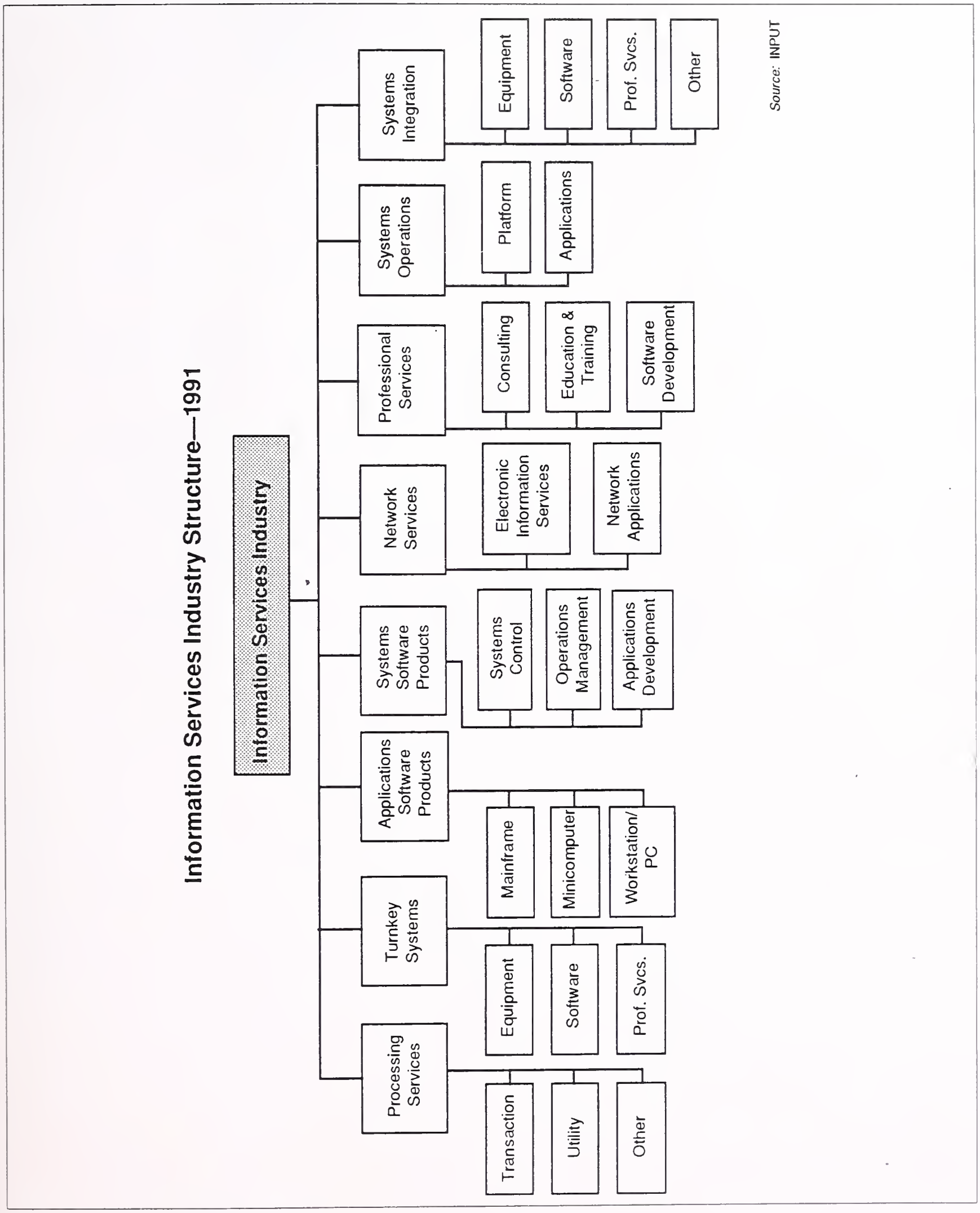
EXHIBIT I-1



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This report is targeted at a discussion of the challenges and opportunities for the development of systems integration projects from the vendors' perspective. Companion reports to this volume, listed below, provide more detailed data on the market, competition for these contracts in Western Europe and user perspectives regarding systems integration.

- *Systems Integration Market Western Europe - 1990-1995*
- *Systems Integration User Issues Western Europe - 1990-1995*

C

Report Structure

Chapter II is the Executive Overview of the entire report, providing a summary of the salient points of the report.

Chapter III discusses the development of the systems integration market in Western Europe, including the reasons why users outsource and the identity of the key players in the buying process.

Chapter IV identifies the major sources of risk in systems integration projects and considers ways in which vendors can seek to minimise risk.

Chapter V considers vendors' current use of alliances and the changing nature of alliances between prime contractors and partners.

Chapter VI analyses the ways in which vendors currently target the systems integration market, the strengths and weaknesses of the main categories of vendor, and the challenges.

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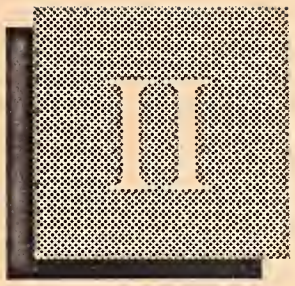
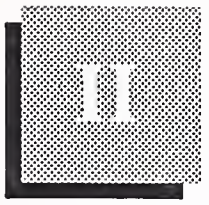


Executive Overview



Executive Overview

A Long-Term Alliances Are a Critical Success Factor for Systems Integration

Because of the scale and complexity of systems integration projects, all systems integration vendors need to develop alliances to fill gaps in their product and service portfolios. However, there are appreciable risks involved in working with new partners and so vendors are strongly in favour of using partners with whom they have worked successfully in the past. As a result, vendors are concentrating on strengthening their relationships with a small number of perceived key players. If a particular partnership is successful, then both vendors become increasingly reliant on one another and committed to the partnership. Ultimately this can lead to equity participation to protect access to key players and as a defensive measure to limit access to competitors.

Other critical success factors include:

- Access to key decision makers
- Rigorous risk management
- Client commitment.

User top management plays a very important role in the buying process for systems integration projects. Vendors recognise the contribution that business consultancy can make in gaining access to these key decision makers. Accordingly a number of vendors including IBM and CGS, have turned to acquisition and joint ventures to gain more influence in this increasingly important sales channel.

At the proposal stage, it is important for vendors to have a strong risk management methodology that will enable them to identify a range of project scenarios and the profit or loss associated with each outcome. The resulting model can be used to assist in the bid/no bid decision, to identify any pricing premiums required, or to persuade the client to adopt a low-risk alternative.

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At the proposal stage and during development, client commitment to the project, and involvement in it, is vital to success. Many projects are technical successes but commercial failures because the client was insufficiently involved and did not constantly ensure that the systems specification was closely aligned to the needs of the business. Rigorous change management procedures are vital both to alert project managers to this potential problem and to ensure the profitability of the project.

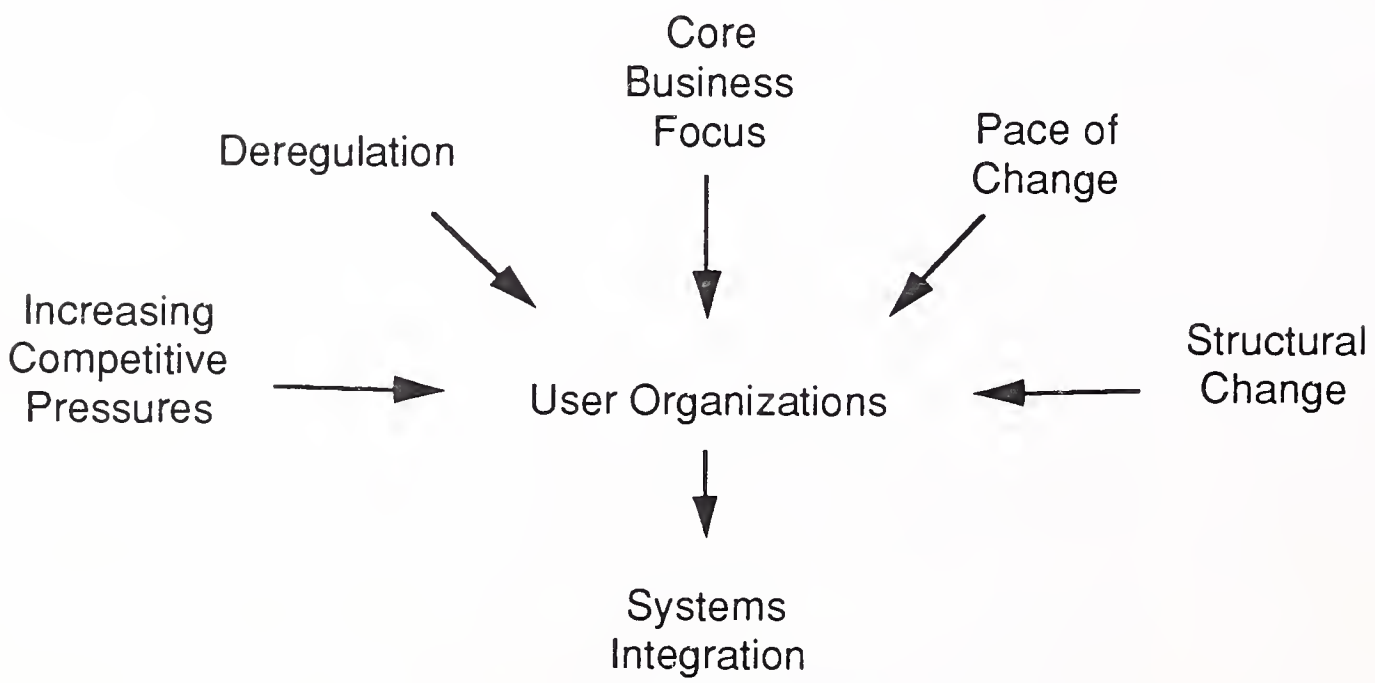
B

Driving Forces

Some of the key driving forces leading to the need for systems integration are shown in Exhibit II-1. Businesses are responding to increasing global competition and higher levels of deregulation by reducing their costs and endeavouring to improve their customer service and responsiveness. This is leading to increased focusing of organisations on their core business, which typically involves both limiting the breadth of their mission and focusing in-house on functions most critical to that mission. However, the ambitions of organisations within their core businesses are increasingly European, if not global, in nature. The result is a need to co-ordinate activities over a considerable geographic area. At the same time, organisations are removing tiers of middle management and seeking to improve communication, and access to information, across flatter organisational structures.

EXHIBIT II-1

Driving Forces
Systems Integration, Western Europe



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The combined impact of changing business practices and increased emphasis on information flow and accessibility is having a major impact on organisations' IS requirements. Applications are becoming large, complex, integrated and cross-functional.

However, this still leaves users with the choice of implementing the systems in-house or outsourcing the project to an external systems integration vendor. The major factors behind the increasing trend to outsourcing are listed in Exhibit II-2.

EXHIBIT II-2

Reasons for Outsourcing
Systems Integration, Western Europe

- Lack of in-house technical capability
- Lack of in-house resources
- Migration to open systems
- Linkage of heterogeneous equipment
- Desire to transfer risk

While end user management within large organisations is often allowed considerable freedom to use external vendors without involving the in-house IS department, this is still a comparatively rare occurrence, and, as shown in Exhibit II-2, the major reasons for outsourcing systems integration projects remain a shortage of relevant skills—technical or application knowledge—or insufficient resources within the in-house IS department.

User IS departments will typically have skills in one or two proprietary architectures, and computer communications tends to be an area of skill shortage. Accordingly any migration to open systems, particularly with a strong communications element, tends to reveal a gap in in-house resources. Similarly the linking of a wide range of equipment, possibly purchased by individual departments in the past, requires external assistance. In both these areas, users are unlikely to have sufficient skilled staff to support major projects.

Another motivation for outsourcing reported by vendors is users' desire to transfer risk to a third party. The perceived risk can be either political or technical in nature.

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C

Sales Channels

Exhibit II-3 lists the key user personnel involved in purchasing systems integration projects in order of importance in the buying process as perceived by systems integration vendors.

Overall user top management and the head of IS are regarded as highly important, with user middle management making a less significant contribution to the buying process.

Obviously management consultancies put more emphasis on their involvement with top management, while professional services vendors tend to achieve most success via IS management.

Many vendors regard systems integration as a main-board-led market, one vendor commenting that the key success factor in systems integration is "to get as high as possible, as quickly as possible."

EXHIBIT II-3

Key User Personnel
Systems Integration, Western Europe

- Board members
- Head of information systems
- Client middle management

Vendors should not, however, underestimate the role of the IS department in the buying process. In the larger organisations, the head of information systems is taking an increasingly business-oriented perspective.

To tackle these buying groups, the most important sales channels are those listed in order of current importance to vendors in Exhibit II-4.

Account managers are regarded as the most important source of leads by vendors. To generate sales leads for systems integration projects, senior account managers with an excellent understanding of the client's industry and current business issues are essential. Often these will be strongly supported by centres of competence and industry experts, to give added business credibility.

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EXHIBIT II-4

Key Sales Channels
Systems Integration, Western Europe

- Account managers
- New business sales force
- Third parties
- External consultants

Systems integration projects are likely to arise only from a comparatively small number of major organisations and so, where these are not already clients of the vendor, it is possible specifically to target them with a new business sales force.

Some vendors such as Andersen Consulting and EDS will typically target main-board personnel, while other vendors see the trends to networking and open systems as their opportunity to penetrate competitors' accounts.

Third parties are a significant source of business for a number of vendors, for example Digital, which can front systems integration projects on behalf of its smaller partners.

In spite of the fact that both business studies and IS strategy studies are important factors in the initiation of systems integration projects, external consultants are seen as currently making the least important contribution in generating business.

However, a number of vendors—including IBM, CGS and CSC—have recognised the importance of this sales channel and are implementing strategies to secure increased business from it.

D

Risk Management

The major sources of risk in undertaking systems integration projects are listed in Exhibit II-5, and these are discussed in more detail later in this section.

It is acknowledged by a number of vendors that making profits from systems integration activities can be more difficult than generating revenues, and this point is regularly illustrated by articles in the press commenting on the failures of major projects.

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To manage the overall profitability of the vendor's systems integration business unit, it is essential that the vendor is very selective in its decision to bid for contracts and that each project is tightly managed on an individual P&L basis.

By far the largest source of risk in undertaking systems integration projects lies in establishing the user's requirements and agreeing on project specification. The most significant causes of project failure are the client's lack of understanding of its own requirements and its failure to take control of steering the project to meet business needs.

Some steps which can be taken to avoid such problems are suggested in Exhibit II-6.

EXHIBIT II-5

The Principal Risks
Systems Integration, Western European

- Customer requirements unclear
- Pricing
- Partners' commitment and performance
- Resource exposure

EXHIBIT II-6

Risk Management—Specification
Western European Systems Integration

- Business-oriented prospect qualification
- Clear acceptance criteria
- Client involvement
- Change control mechanisms
- Setting client expectations

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Firstly the qualification process must ensure that the business rationale and cost justification for the proposed project are sound. If this proves not to be the case, then the vendor should either suggest more appropriate alternatives to the client or decline to submit a proposal.

One of the first signs, once development is underway, that a specification had serious flaws is a large number of change requests originating from the users. To highlight such problems and to ensure the profitability of the project, the vendor must have initially established clear acceptance criteria and must rigorously enforce change control procedures.

It is important that the client's project co-ordinator feels accountable for the success of the project and has a strong sense of ownership. A lack of user involvement or accountability will frequently lead to failure of the project in its goal of supporting the business. All user requests for changes to the specification should be jointly reviewed by user and vendor project co-ordinators. The user's project co-ordinator must have the necessary business knowledge and authority to decide whether any change requests are cost justifiable from a commercial perspective.

Formal methods of financial risk management also assist in reducing the probability of financial loss, and some of the techniques which can be used are highlighted in Exhibit II-7.

EXHIBIT II-7

Financial Risk Management
Western European Systems Integration

- Ensuring pricing reflects risks
- Time and materials for fact finding
- Fixed price for well-defined stages
- Bid/no bid models
- Risk assessment models

The first decision which has a very significant impact on profitability is the decision whether or not to bid for each project. Bid costs are high; if the vendor's chances of success are low, then it is prudent to withdraw before considerable costs and personnel are committed.

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Formal risk assessment models can be used at the qualification stage and throughout the proposal development process to evaluate the levels of profitability of the project under a number of different scenarios, taking into account all commercial and technical risks. A judgement can then be made in the knowledge of the potential maximum risk and its likelihood, and the level of return provided by the expected value of the project.

Overall it is important that the price quoted to the client reflects the risks involved, especially as most clients expect systems integration development work to be conducted on a fixed-price basis. At one extreme, if the client can live with a degree of price uncertainty, then more money goes towards systems functionality. At the other extreme, comparatively risky fixed-price contracts should carry a considerable contingency premium.

Technical risk can also be an important consideration in systems integration projects due to their unique nature, and some of the factors which should be taken into account are listed in Exhibit II-8.

EXHIBIT II-8

Technical Risk Management
Systems Integration, Western Europe

- Equipment performance
- Technical innovation
- Transfer risk to client

Most vendors endeavour to avoid technical innovation wherever possible within systems integration projects using only established equipment and software products. Similarly vendors try to avoid performance guarantees such as system availability and response times. Although prototyping can be adopted as a last resort, response times can be difficult to predict with any certainty for one-off projects.

Where the client is in favour of a high-risk approach or insists on performance guarantees, one approach is to show them the risk management model and explain the financial implications of the various alternatives. In this way, the client can be either steered towards a low-risk solution, or persuaded to take responsibility for the financial risk inherent in, for example, a need for equipment upgrades.

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E

Use of Alliances

Because of the scale and complexity of systems integration projects, vendors need to develop alliances to fill the gaps in their product and service portfolios.

The current pattern of need for alliances exhibited by equipment vendors, professional services vendors, and management consultancies is shown in Exhibit II-9.

EXHIBIT II-9

Need for Third-Party Services
Western European Systems Integration

Services Required	Vendor Category		
	Equipment Vendor	Professional Services Vendor	Management Consultancy
Application Software Products	High	High	High
Equipment	Low	High	High
Business Consultancy	Medium-High	High	Low
Professional Services	Medium	Low	Low

Equipment vendors typically use partnerships to give them access to application software products and the software development resources required to implement and integrate them. Traditionally the major equipment vendors have had little difficulty in getting access to suitable partners in these areas. Their immediate challenge is to develop alliances that will provide enhanced business consultancy capability.

The professional services vendors have strong in-house development and implementation capability, but again often have a high dependence on alliances for access to suitable application software products. In many instances, their account management is weaker than that of the equipment vendors and they have a strong requirement to supplement their business consultancy expertise and resources.

The use of business consultancy in initiating systems integration projects is becoming one of the critical success factors in the systems integration

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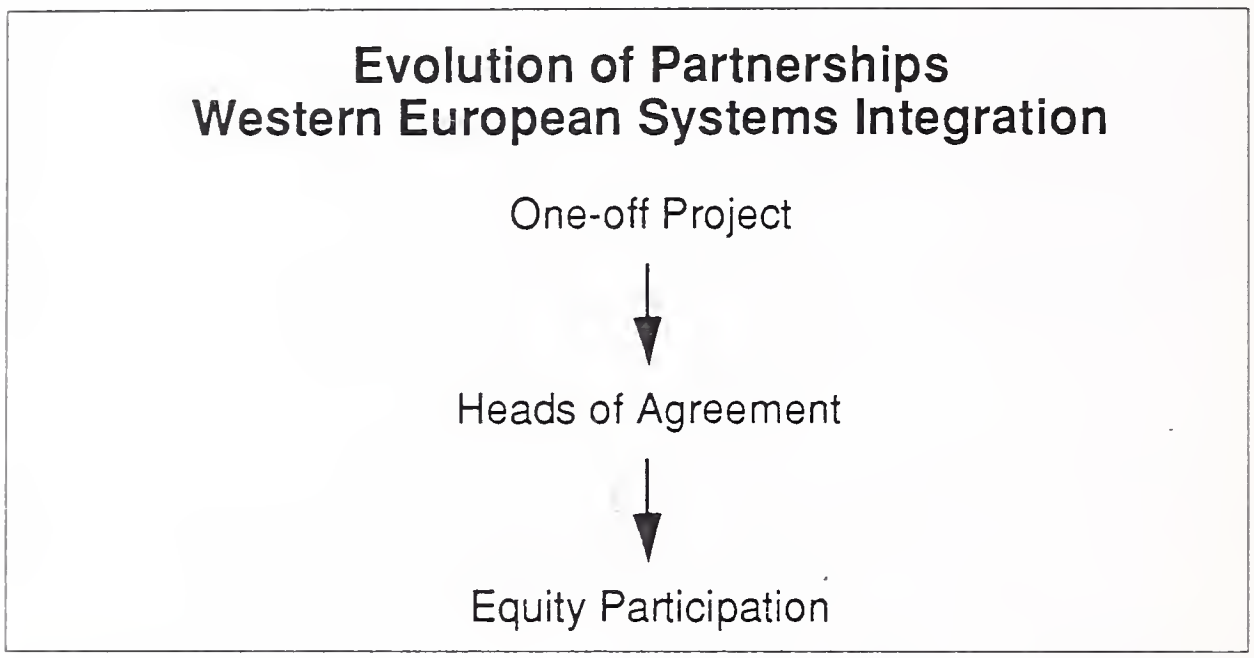
market, and is providing a major boost to consultancies, such as Andersen Consulting, that have seen their revenues increase dramatically in recent years. Vendors such as Andersen Consulting have their own professional-services capability but depend on alliances for a wide range of application software products.

This strong need for alliances in support of systems integration activities is leading to an evolution in the nature of these alliances as illustrated in Exhibit II-10.

EXHIBIT II-10



Vendors have frequently found it futile to set up alliances in advance of specific opportunities, so most alliances begin as one-off agreements to target an individual prospect and develop according to the level of success encountered and the future pattern of sales leads.

As a particular partnership becomes successful, the vendors become increasingly reliant on one another and committed to the partnership. At this stage, heads of agreement are commonly signed, which form letters of intent for the vendors to work together on particular categories of projects.

To protect access to key partners, and possibly as a defensive measure to limit access to competitors, partnerships can ultimately lead to equity participation. So far equity participation has been mainly used by vendors to protect their access to application software products, but it could feasibly be used by equipment vendors to protect their involvement with key professional-services vendors and consultancies.

There is an appreciable risk involved in working with new partners and so vendors are strongly in favour of using partners with whom they have worked successfully in the past. Some of the advantages of working with established partners are shown in Exhibit II-11.

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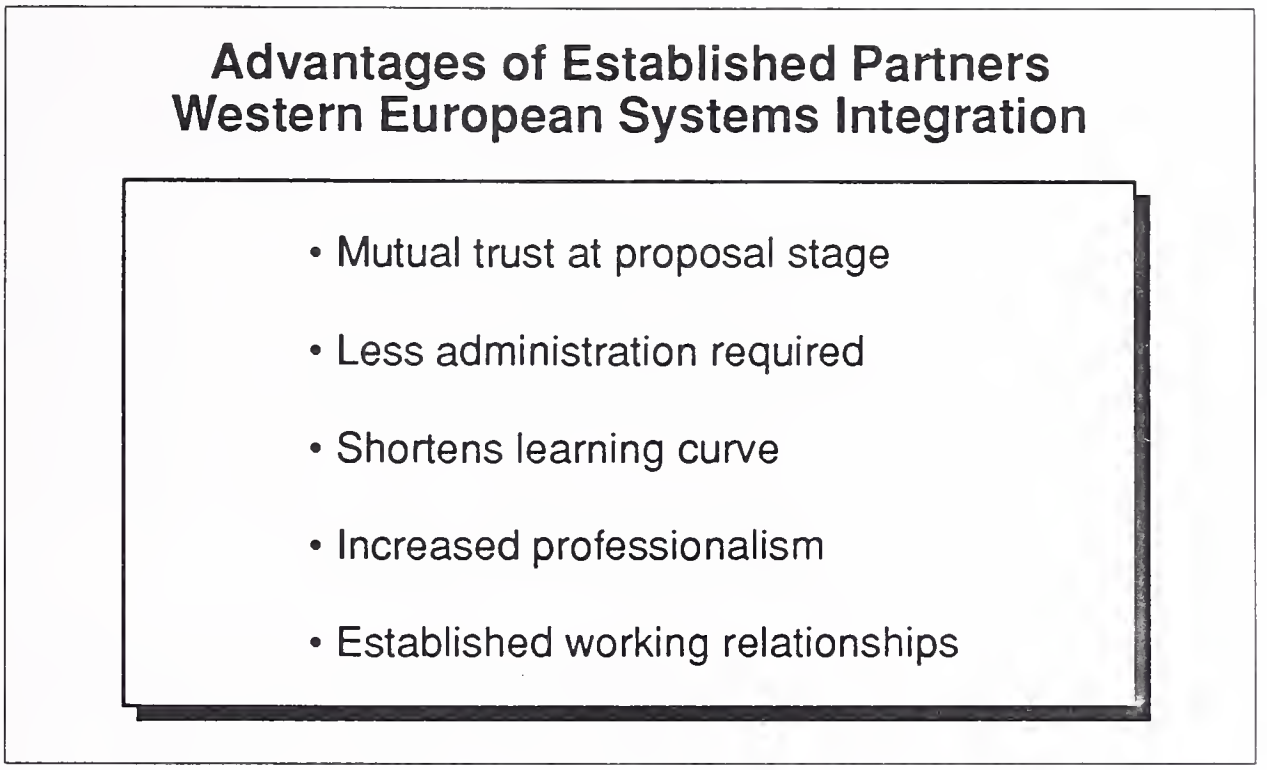
EXHIBIT II-11



Firstly it is important that there is mutual trust at the proposal stage, with all partners sharing a conviction that the proposal itself represents a worthwhile investment and the belief that there is fair apportionment of risk and reward for each participant.

Secondly a considerable amount of negotiation and administration can be required in a new alliance. Some systems integration vendors have onerous procurement rules for establishing the financial stability and professionalism of potential partners, and agreed procedures and codes of practice need to be established.

On the other hand, if vendors have worked together in the past, then they have some appreciation of each other's working practices, which can reduce the likelihood of misunderstandings and shorten the learning curve.

Increased levels of professionalism should result from the above, leading to improved client responsiveness and a greater probability of success in winning and successfully completing the project.

Access to key partners, typically with strong industry skills and experience, is becoming a key success factor in systems integration. As a result, vendors are concentrating on strengthening their relationships with a small number of perceived key players.

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F

Vendor Strategies

Exhibit II-12 lists the types of targeting adopted by the major systems integration vendors. Because of the scale, complexity, and cost of systems integration projects, only the major organizations within each country are appropriate targets for systems integration vendors.

External business pressures, particularly competitive pressures, are key initiators of radical changes in business strategies. The resulting need to align information systems with changed working methods and organisational structures can have a major impact on an organization's information systems strategy. Accordingly some vendors specifically target industry sectors that are undergoing radical change, such as the banking and finance sector.

However, in many industries at present, there is a strong trend towards improved responsiveness and value chain integration. Moreover, the technology is now available to enable users to link heterogeneous equipment and applications to provide widespread access to information. As a result, a number of vendors are specifically targeting companies with highly distributed operations and emphasising their skills in networking and open systems, irrespective of the mix of proprietary architectures on which the user's applications are based.

EXHIBIT II-12

Vendor Targeting
Systems Integration, Western Europe

- Major organisations
- Industries undergoing radical change
- Companies with highly distributed operations

Some of the key trends in vendor strategies are shown in Exhibit II-13.

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EXHIBIT II-13

Firstly, there is the emphasis being placed on business consultancy. In that segment of the systems integration market controlled by top user management, the management consultancies have a major advantage over the other categories of systems integration vendor. As a result, many vendors seek to establish strategic alliances with the consultancies. However, alliances are not always easy to achieve since many of the consultancies recognise the importance of maintaining their perceived independence. The resulting difficulties in influencing the consultancies, together with their increasing tendency to act as prime contractors on their own behalf, has led to a number of vendors such as IBM and CGS turning to acquisition and joint ventures to gain more influence in this sales channel.

Secondly, as the systems integration market matures, vendors will tend to settle into fixed consortia to serve particular industries or provide particular types of solution. This means that there will be some competition between vendors for key partners, and strategies such as extensive free support or equity participation will be used by vendors to stabilise these alliances. This trend may accelerate as open systems become more widespread and product branding becomes a key determinant of application software product success. Vendors will then need to ensure that they have access to, and expertise in, the market leading products.

At present, open systems are being used by the secondary tier of equipment vendors to target large accounts that have traditionally been dominated by proprietary IBM and Digital solutions.

Exhibit II-14 illustrates the congruence of management consultancy and information systems, with a number of examples. Andersen Consulting has achieved substantial growth in recent years by becoming the first

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management consultancy to focus on the development of IS strategies in support of business needs and to follow this up with a considerable systems development capacity.

It is much easier for a management consultancy to gain acceptance with users for its development capability than for a traditional software and services vendor to become accepted for its management consulting capability. To counter this image problem, IBM has formed a joint venture with Coopers & Lybrand while CGS and CSC have acquired a number of consultancies.

EXHIBIT II-14

Management and IT Consultancy Congruence

- Andersen Consulting
- Meritus
- CGS/United Research
- CSC/Index Group

In order to maintain account control, the major equipment vendors are aggressively targeting systems integration, and their strengths and weaknesses in this market are evaluated in Exhibit II-15.

EXHIBIT II-15

Equipment Vendors, Strengths and Weaknesses Systems Integration, Western Europe

Strengths	Weaknesses
Account management	Business consulting skills
Financial solidity	Cannot afford to alienate IS management
	Lack of development expertise/resources

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The equipment vendors typically have strong industry groups with high levels of business knowledge acting in support of high-calibre account managers. They have good contacts at IS management level and some capability in influencing senior management. Although vendors such as IBM have had a good industry focus for many years, they are still dependent on alliances for the bulk of their application software products and for much of their development/implementation expertise.

Equipment vendors' major weakness is a lack of management consultancy expertise and lack of perception as consultants. To some extent this can be overcome by acquisition and joint ventures. However, there remains one potential problem. Vendors such as Andersen Consulting and EDS can afford to alienate IS management totally in their attempts to persuade top management to outsource. The equipment vendors cannot afford to do this in their own accounts without putting their equipment sales at risk.

The equipment vendors need to target prime contractorship within systems integration to maintain account control, but they may need to achieve this in co-operation with IS management rather than in opposition to them.

The professional services vendors arguably have the best relationships with IS management of any of the three categories of vendor discussed here, and their strengths and weaknesses are listed in Exhibit II-16.

EXHIBIT II-16

Professional Services Vendors' Strengths and Weaknesses, Systems Integration, Western Europe

Strengths	Weaknesses
Relationship with IS management	Business consulting skills
Project management skills	Lack of access to user top management
Implementation/technical skills	

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The professional services vendors are well regarded by IS management for their project management and software development skills. However, in general they have comparatively weak account management skills and underdeveloped business consulting skills. Accordingly their access to top management is comparatively weak.

This leaves three alternatives open to the professional services vendors in targeting systems integration. Firstly some of the larger vendors such as CGS can acquire business consulting skills and target top management in competition with the consultancies and some of the leading equipment vendors. Another alternative is to target systems integration projects originating from IS management, where they are in a good position to compete with the consultancies and equipment vendors, provided they can improve their industry sector targeting.

Thirdly they can concentrate on remaining subcontractors for the major equipment vendors, which have a strong need for software development resources.

The strength and weaknesses of the consultancies such as Andersen Consulting are listed in Exhibit II-17. These vendors are concentrating with some success on using their perceived superiority in business consulting to generate systems integration projects via their involvement with user top management.

EXHIBIT II-17

Management Consultancies' Strengths and Weaknesses, Systems Integration, Western Europe

Strengths	Weaknesses
Business consultancy skills	Poor relationship with IS management
Access to user top management	

Many information systems managers are very wary of the consultancies and are reluctant to allow them a foothold within their organizations. However, overall the consultancies are in an extremely strong position since much systems integration business is initiated at board level, and the consultancies have a level of business credibility that is currently difficult for the equipment vendors and professional services vendors to match.

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G

Vendor Challenges

The principal challenges facing vendors that are targeting systems integration are listed in Exhibit II-18.

EXHIBIT II-18

Vendor Challenges
Systems Integration, Western Europe

- Access to key decision makers
- Client understanding of requirements
- Managing organisational change
- Building key partnerships
- Profitability

The main challenge, given the comparatively small number of systems integration contracts awarded, is to achieve access to the key decision makers, particularly top management. Business consultancy and IS strategic consultancy are proving important tools in achieving this goal. This is reflected in the increasing trend for software and services vendors to acquire or form joint ventures with consultancies.

It is also likely that additional consultancies with IS expertise will seek prime contractorship in systems integration projects. Another key challenge is to develop long-term partnerships with key subcontractors. This typically involves concentrating on a number of vertical markets and filling the gaps in the relevant product/service portfolio via alliances with the leading vendors in these fields.

Once a contract is won, one of the most significant challenges is to ensure the client's ownership and commitment. The client must have a clear understanding of requirements and the business rationale that lies behind them, and be prepared to play a full part in the management of the project. Too many projects are technical successes but commercial failures because the initial specification did not match the need or because the client's business environment has changed while development was underway.

Of course, the overriding challenge is to make a profit from systems integration. Some of the major influences on profitability are listed in Exhibit II-19.

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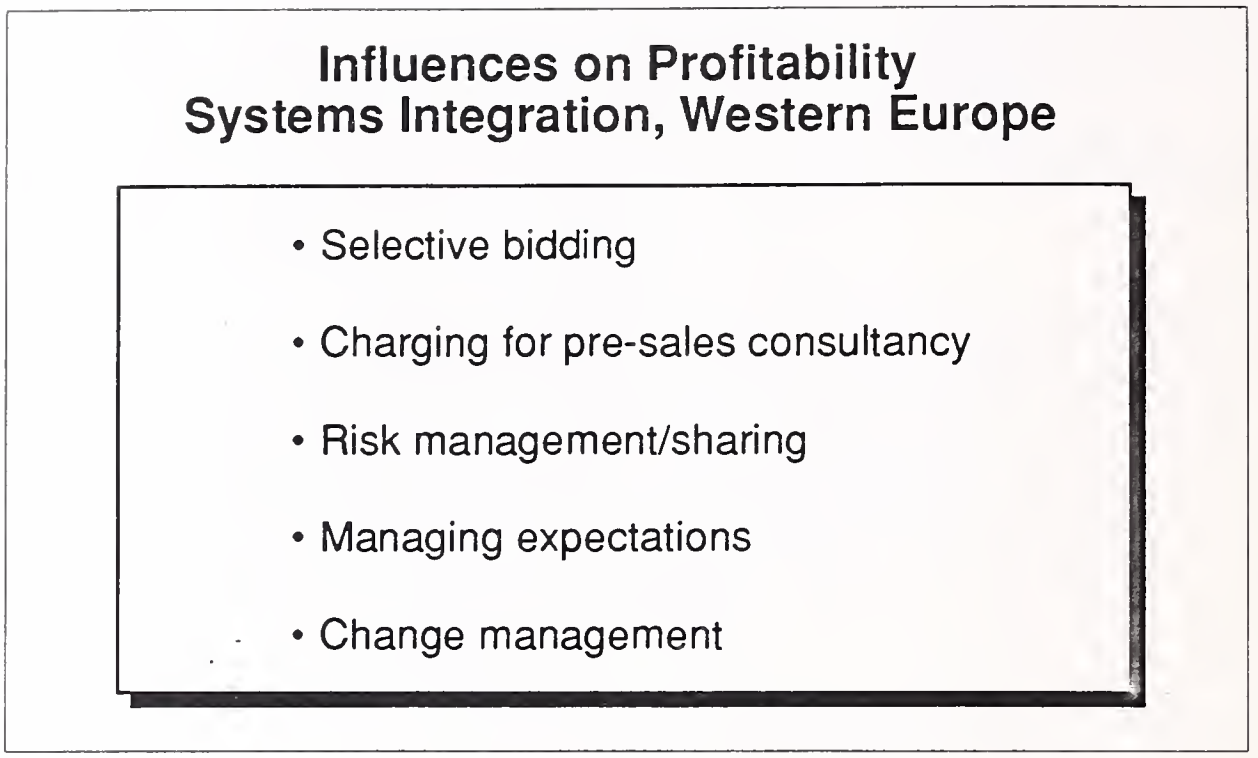
EXHIBIT II-19



Firstly it is important for vendors to be selective in bidding for systems integration projects. Bidding costs are high and vendors typically aim to win one in three of proposals issued. In order to achieve this, vendors need to be well focused and to use formal bid/no bid models to evaluate their chances of success for each proposal. A related problem for some of the equipment vendors in particular is in charging for consultancy. Clients have become used to the equipment vendors providing advice free of charge and making their margins on any resulting product sales.

At the proposal stage, it is important for vendors to have a strong risk management methodology that identifies possible scenarios and evaluates the profitability of each. The resulting model can be shown to the client where appropriate as a means of persuasion to adopt a lower-risk alternative or to participate in the financial risk of the project.

Once a project commences, it is important to liaise closely with the client and to manage his expectations. While client needs may evolve during the course of a project, it is important for vendor profitability that a rigorous change management procedure is enforced.

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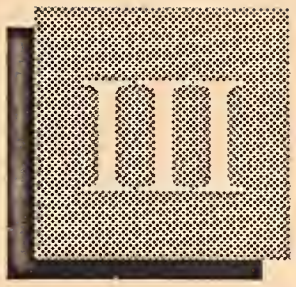

Market Development

III

Market Development

A Overview

Major systems integration contracting became a market of major focus in Western Europe during the second half of the 1980s. Originally a market that was almost entirely defence oriented, the last few years have witnessed a rapid development of the commercial sector. Exhibit III-1 shows the comparative sizes of the Western European commercial and government/defence sectors of this market and their five-year growth forecast. For more detailed statistics on the market opportunity in Western Europe, see the INPUT report *The Systems Integration Market—Western Europe, 1990-1995*.

To date, the movement towards large-scale systems integration project contracting has largely been driven by the major U.S. vendors, notably:

- Andersen Consulting
- CSC
- EDS
- IBM
- Unisys

Of these vendors, Andersen Consulting and IBM have been particularly forceful in leading the market in Western Europe, as is clearly shown by their market leadership position in Exhibit III-2. These vendors have benefited from the scale of their operations in the United States, which is a considerably greater market opportunity than Western Europe. The comparative market sizes are shown in Exhibit III-3. This exhibit also underlines the significance of the federal government market in the United States for systems integration contracting.

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EXHIBIT III-1

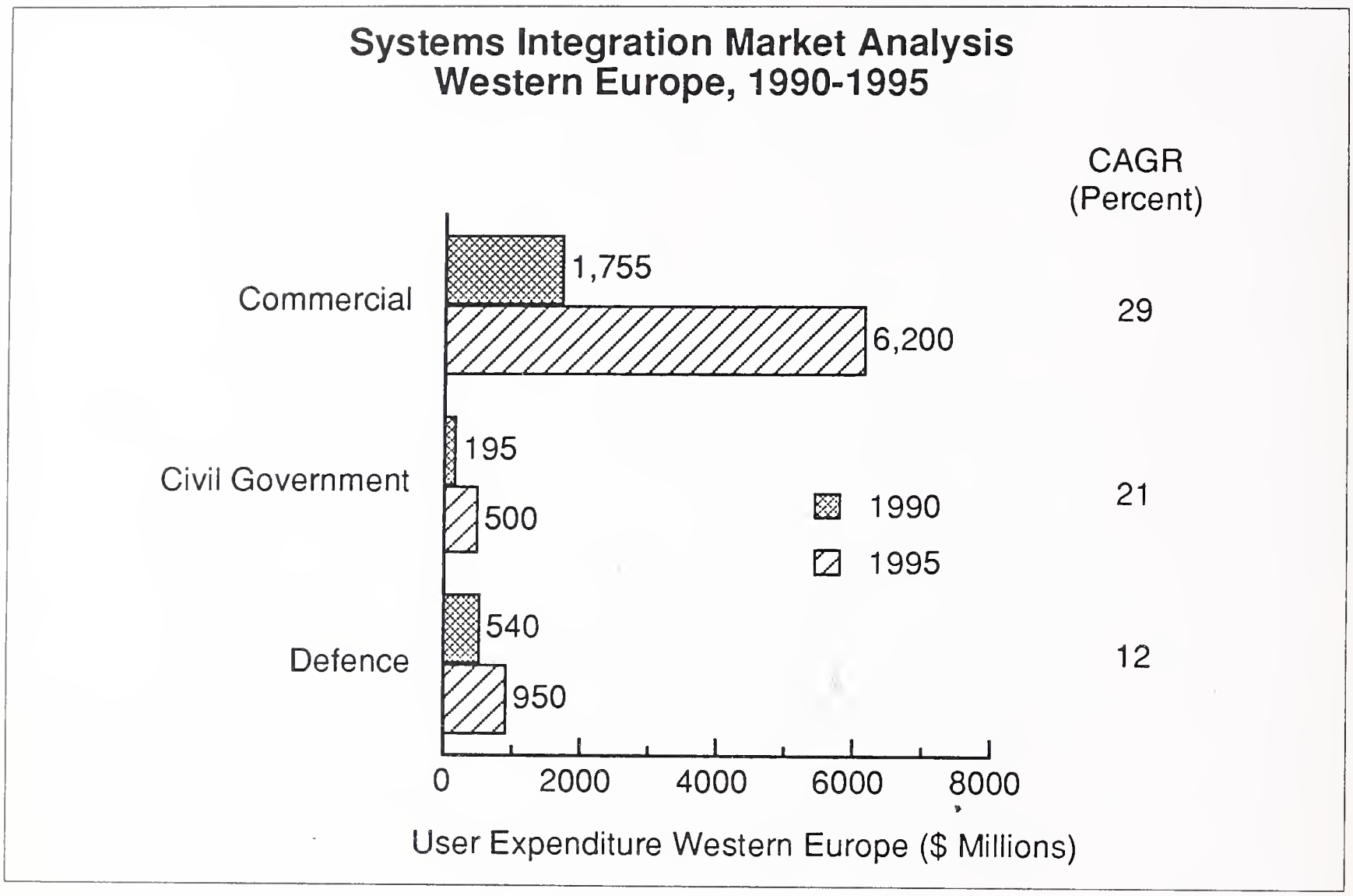

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EXHIBIT III-2

Western Europe Vendor Ranking
Systems Integration, 1989

Rank	Company Name	Market Share (Percent)	Estimated Revenue ($ Millions)
1=	Andersen Consulting	11	210
1=	IBM	11	210
3	Cap Gemini Sogeti	10	190
4	Siemens	5	90
5=	SD-Scicon	4	75
5=	Sema Group	4	75
7	Logica	4	70
8	Unisys	3	65
9	Bull	2	45
10	Olivetti	2	45
	Others	44	900
	Total	100	1,975

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EXHIBIT III-3

Systems Integration Markets
Western Europe/U.S. Comparison

Market	User Expenditures		
	1990 ($ Billions)	1995 ($ Billions)	CAGR (Percent)
Commercial			
Western Europe	1.8	6.2	29
U.S.	3.9	10.8	23
Government			
Western Europe	0.7	1.5	15
U.S.	2.5	4.6	13
Total			
Western Europe	2.5	7.7	25
U.S.	6.4	15.4	19

Systems integration provides the ability to create a solution that integrates disparate environments. It has three key aspects distinguishing it from other modes of delivering systems solutions.

- The multivendor nature of systems integration enables the appropriate technical skills to be applied to the system. Typically systems integration projects are complex, involving more than one technology.

- Systems integration is a custom solution, with the contractor generally taking responsibility for integrating the system into the user environment.

- Systems integration vendors take management responsibility for the delivery of the system, usually at a fixed price with penalties for project overruns.

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Projects that satisfy these three conditions and thus qualify for inclusion tend to be large, expensive and multivendor in nature. The components of the systems integration sector can be analysed into four distinct groups:

- Systems equipment
- Professional services
- Software products
- Other services

This service delivery mode thus includes equipment wherever it is included as part of the overall systems integration contract. Professional services is the most important sector in any systems integration contract, ranging from consulting though software design and development services to the key project management services responsible for delivering the complete system solution. Both systems and applications software products are also likely to be represented in a systems integration contract—as well as processing and network services, which are included in the "other" services sector. Also included in "other" services would be such postimplementation support as testing, client staff training, documentation, and operation and maintenance of the developed system for a specified time.

Exhibit III-4 enumerates the component products and services that may be a part of a systems integration project and from which the vendor can expect to receive revenue. Each project's unique requirements dictate which of these components are applicable to the project and the proportion of the total project expenditures for each component involved.

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EXHIBIT III-4

Products/Services in Systems Integration Projects

Equipment	Information Systems Communications
Software Products	Systems Software Applications Software
Professional Services	Consulting - Feasibility and trade-off studies - Selection of equipment, network, and software Project Management Design/Integration - Systems design - Installation of equipment, network and software - Demonstration and testing Software Development - Modification of software packages - Modification of existing software - Custom development of software Education/Training and Documentation Systems Operations/Maintenance
Other Miscellaneous Products/Services	Site Preparation Data Processing Supplies Processing/Network Services Data/Voice Communication Services

The following characteristics are typical of complex, multidisciplinary information systems integration projects:

- Projects are usually multiyear efforts.
- Projects have significant project management demands.
- Target systems are usually strategically significant to the client's information environment.
- These systems require significant portions of the software to be custom developed and may include a large network requirement.

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Generally, systems integration projects are bound at the start by the selection of the successful bidder and at the end by the acceptance of the new system by the client. The close relationship between the vendor and the contractor can lead to sales of additional products or services unrelated to the project, but these opportunities have been explicitly excluded by INPUT in the market analysis and development of the forecast.

Critical to the approach from the client's and the vendor's perspectives is the sharing or total transfer of responsibility (and risk) for the successful development of the system from the client organisation to the vendor(s). In exchange for assuming the risk of contracting to deliver the desired solution on time and within budget, the integrator receives not only project management fees from the client but also markups from subcontractors.

Traditionally systems development has been managed in-house, with the outside supplier providing only specific services and products. However, many in-house information systems departments are unable to keep pace with fast-changing technology, or to respond swiftly to the need for major systems changes. The appropriateness of systems integration as a response to user needs is driven therefore by a greater willingness on the part of clients to contract out management responsibility to third-party vendors.

B

The Market Environment

A variety of factors are generating increased user interest in outsourcing information systems management functions, a significant part of which is represented by the systems integration opportunity. These factors include the overall economic environment within which users must operate, the availability of information technology products and services, and the way in which they are utilised and managed. These factors are discussed below.

1. Economic Environment

The term *economic environment* is used here to refer to the complete external situation within which an organisation must operate and respond to, both tactically and strategically, if it is to survive. Information-systems-based applications are increasingly an important part of that response. The external environment is the instigator of the need for change that affects the organisation and subsequently its information systems. Exhibit III-5 summarises the main agents of change affecting European organisations.

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EXHIBIT III-5

Information Technology Driving Forces

Industry	Organisation	Information Systems
Globalisation and the single European market	International opportunities and competition	International processing requirements
Deregulation	New opportunities and increased competition	New application requirements
Specialisation	Core business and functions	Strategic systems
Pace of change	Structural change	Rapid response and deployment
Integration	Intraorganisational relationships	Intra- and interorganisational systems

Few industries are free today from international impacts. Market barriers are being removed, particularly within Europe in relation to the development of the post-1992 single market, creating new opportunities and permitting the entry of numerous new competitors. Today's information systems strategy must:

- Provide international access
- Use international standards
- Support international operations

Deregulation in the telecommunications, banking and finance and insurance sectors is another factor affecting the overall economic and business environment. It has already had a dramatic impact on the information systems needs of the organisations in these sectors, as well as having far-reaching effects on the overall business environment.

The failures of the merger/acquisition explosion of the 1980s are causing senior management to focus on the core of an organisation's capabilities. The result is a more specialised and focused organisation that emphasises what it does best. Not only are organisations limiting the breadth of their mission, they are focusing on the functions most critical to that mission.

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If an automobile company does not need to manufacture radios to maintain its product differentiation, it also does not need to operate its own central computer centre. Information systems programmes must:

- Concentrate on strategic systems that support the critical functions.

- Provide the most cost effective alternative for secondary systems requirements.

The pace of change in the world has never been more rapid. Certainly information technology has been a factor in speeding up the pace, and it remains the primary tool to help management deal with that pace. In the 1970s it was acceptable to take three to five years to build a major new system. Today it can be assumed that in three years the priorities will be different, and that the organisation will be structured differently. It is therefore likely that the system will not meet the new requirements.

- Today's IS programme must be prepared to react rapidly to unplanned requirements, large or small.

- Doing the routine is important, but doing the unplanned is the measure of success today.

Competing on a global basis, specialising as a source of competitive strength, and responding rapidly to change drive today's critical requirement to integrate all aspects of an organisation. Since the core of integration is the flow of information, the impacts on the IS programme are extensive.

- Internally, the information network must support the flow of the organisation. Today's applications are described as large, complex, integrated and cross-functional.

- Externally, today's IS programme must create interorganisational systems, for example, through the introduction of electronic data interchange (EDI) systems.

No large business or organisation is free from unexpected significant change today. Mergers, acquisitions, divestitures, management buyouts, and reductions in work force and levels of management are all commonplace. These occurrences introduce a requirement for change into the information systems strategy that was not common just a few years ago. Change is a strong element of the equation that is driving outsourcing within the information systems arena today.

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2. Information Systems Management Challenges

The new and changing organisational needs are just one of the forces challenging information systems managers. Additionally, business executives and administrators are seeking effective returns on their IS investment. Exhibit III-6 lists the key challenges for IS managers in today's more exacting environment.

Achieving an effective return on IS investment implies a need for improved project-delivery performance. The history of delays and cost overruns that have so frequently occurred in the past clearly indicated less than adequate performance, exacerbated by the implementation of application systems that have in practice had limited utility.

Software development methodologies have been presented as the solution to these problems. While undoubtedly these methodologies and the appropriate software tools through which they are in practice implemented have achieved success, too frequently they are seen as purely a technical solution. Applications must be developed with a clear linkage to the business needs. Quality assurance requirements can degenerate, for example, into a pure enforcement of standards and ignore the external realities of the application. Advances in software technology, like 4GLs and relational database management systems, have also created quality problems, for example, serious degeneration of system response times.

EXHIBIT III-6

Key IS Management Challenges

- Improve project delivery performance
- Apply business focus
- Manage applications maintenance
- Adapt to new technology
- Manage human resources

Another important challenge is applications maintenance, which absorbs a very considerable proportion of in-house development staff. Estimates have been put forward for anything between 50% and 70% of total in-house resources dedicated to this task. Additionally, IS managers face increasing technology challenges. Large user organisations have been slow to relinquish the perceived power inherent in a centralised mainframe system. Downsizing is, however, now becoming a very serious issue for many companies.

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Staffing or human resources issues are also a key challenge for IS managers. In many IS departments, staff turnover is higher than that in the rest of the organisation despite separate pay structures designed to offer higher compensation to retain them longer. It is often felt that IS personnel are more loyal to their "profession" than their employer.

A common complaint is that IS staff are more concerned with technical issues, working on an advanced software product to gain personal experience perhaps, than with the business aims and application needs of the organisation that employs them. Another problem is the lack of communication that so frequently occurs between computer professionals and those who understand the business needs, exacerbated by jargon that turns systems issues into technical issues. This is not a trivial issue, as evidenced by the case of system-development methodologies originally conceived to be a business approach to computerisation. These methodologies have become repositories for techniques, and these techniques then become more important than the methodology. Discussions about the merits or otherwise of design methods, through use of terms such as structure, cohesion, entities and coupling, have made the methodology incomprehensible to many end users who are asked to approve the system design.

IS staffing can thus exacerbate the overall IS performance challenge in which personnel cannot understand or relate to the overall business application requirement. A potential benefit of outsourcing to client management is the removal of the entire IS function from the organisation's payroll.

The need to get results from information systems, not just a return on an investment or an improvement in project schedules, is leading to the development of longer relationships with external vendors. Key to successful fulfillment of corporate IS goals is the bridging of business application requirements and the technical competence to implement the solution. The information services vendor must have a deep understanding of the client's operation and be able to act as a long-term repository of IS experience. The complexities of modern systems are making short-term contractual arrangements with third parties extremely difficult to manage.

Another important driving force for systems operations, referred to above, is the increasing complexity of information technology. Thus, whilst it is absolutely necessary and desirable to have staff who can apply the technology to the business aims, it is also necessary to have staff who are competent to select and utilise the most appropriate products and methods to achieve those objectives.

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Important information technology challenges facing users include:

- Increasing complexity of operational management systems software.
- Technology change as manifested in downsizing.
- Communications network operations.
- De facto and de jure standards.

Information systems are becoming more complex and more difficult to operate. Individual system units are more reliable; user interfaces may be more simplified, but when disparate units are connected in cooperative processing modes and communication networks, the complexity is vastly increased.

3. Outsourcing

The overall economic situation and the specific information systems challenges, both management and technological as discussed above, are conspiring to change the environment within which information systems are provided. It is becoming a very different environment from that pertaining a few years ago. Exhibit III-7 summarises the principal characteristics of the changed IS environment anticipated for the 1990s:

- Today's use of information technology results in complex solutions, not individual applications. Yet the user expects them with faster delivery than ever before.
- The size and length of the commitments that buyers (users and information systems) are willing to make are much larger. The focus is on solutions—not the bits and pieces that have been the general buying patterns of the 1970s and 1980s. The buyer today turns to a single purchase point, a full service vendor that can deal with a complex problem.
- The vendors that are leading the way in the changing information systems and services market have also changed.
  - They are now ready, able and willing to take on a broad set of responsibilities and to invest in the relationship with the client.
  - They are interested in long-term versus short-term relationships with their primary customers. The goal is a partnership—not a subcontractor relationship—that provides lasting client relationships and account control. This partnership makes the vendor's investment possible and of mutual value.

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- The typical outsourcing relationship includes a much greater service element than before.
  - First, there is a large component of professional services as the buyer looks outside for expertise as well as technology solutions.
  - Second, the vendor is providing a significant management component that was simply not provided previously. The relationships are being formed at a much higher level of client and vendor management.

EXHIBIT III-7

Information Systems Characteristics for the 1990s

- Complexity of IT solutions
- Size and length of commitment
- Breadth of responsibility assumed by vendor
- Partnership versus supplier/subcontractor
- Professional services component
- Systems management

Information systems management is being challenged by its management and the vendor community to look differently at the process of buying products and services. This is why outsourcing has become a key issue for the early 1990s within the information systems arena, just as systems integration had already become a key issue in the late 1980s.

Outsourcing is causing some fundamental changes in the structure of the information systems and services market. Exhibit III-8 provides a comparison between the industry modes as used by INPUT to project the industry and the market opportunities developing out of this outsourcing trend.

- Over the past three years, INPUT has modified its delivery mode structure to identify systems integration and systems operations as emerging and unique delivery modes. They represent significant shifts in the professional services and the processing services markets respectively.

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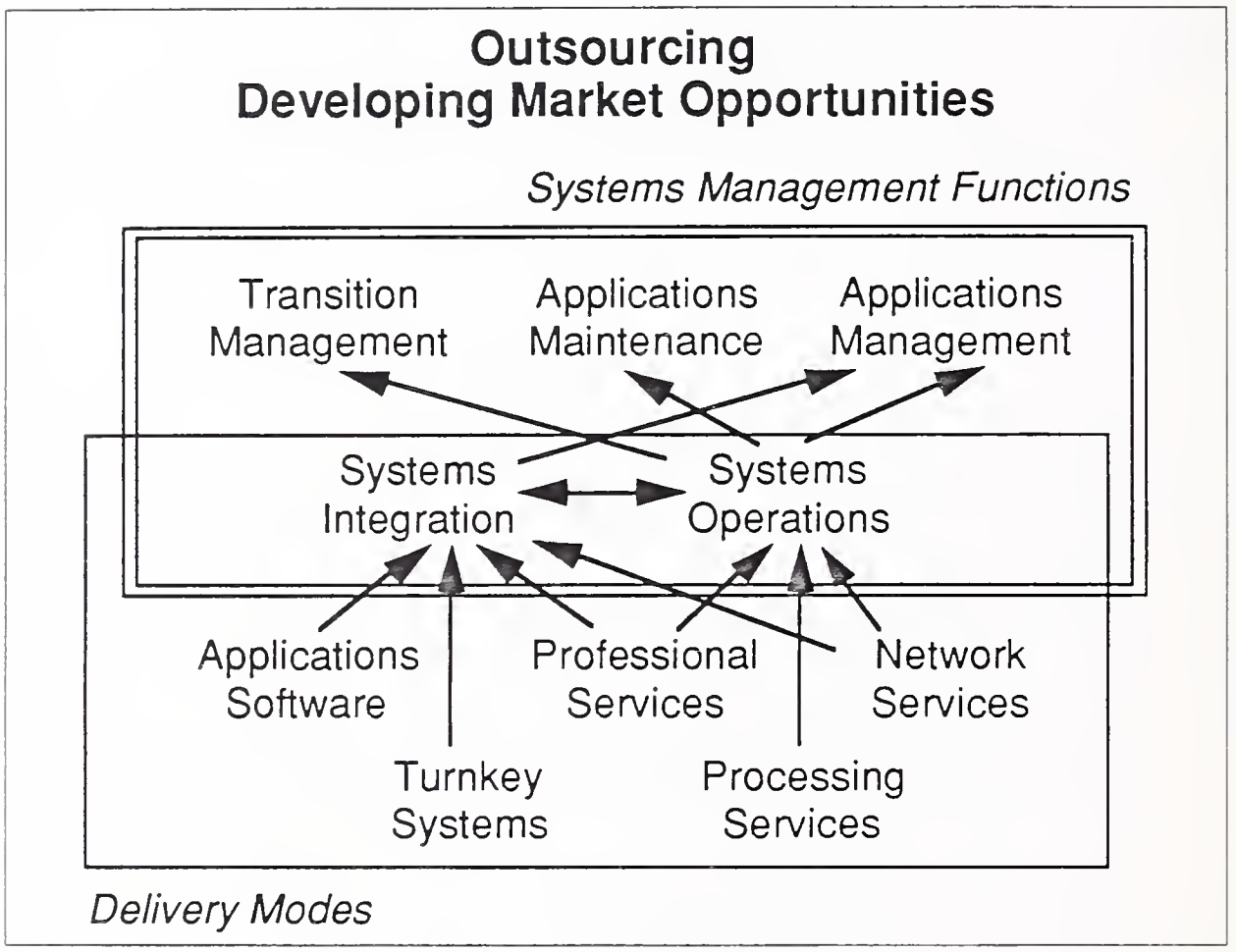
- Systems integration and systems operations, plus additional combinations of products and services from all of the delivery modes, represent opportunities for vendors in the 1990s. Applications management, transition management and applications maintenance represent emerging opportunities for information systems to draw on expanding vendor capabilities.

  - Users can improve response, cost-effectiveness and planning.
  - Vendors can capture more business opportunities.

EXHIBIT III-8



C

Market Trends

1. Professional Services Trends

Some further insights into the environment for systems integration contracting can be obtained by examining the wider opportunity for professional services. Virtually all systems integration vendors are active in the professional services market as well. As part of INPUT's 1990 research programme, a leading set of European services vendors were questioned concerning their evaluation of the major driving and inhibiting forces affecting the overall market for professional services. The results of this research are provided below. Exhibit III-9 shows the analysis of the factors which vendors considered as stimulating the market.

The growing size and complexity of IS projects is clearly the primary driving force in the growth of professional services business. Most users have difficulty affording or recruiting the mix of necessary knowledge and skills required for implementing modern information systems,

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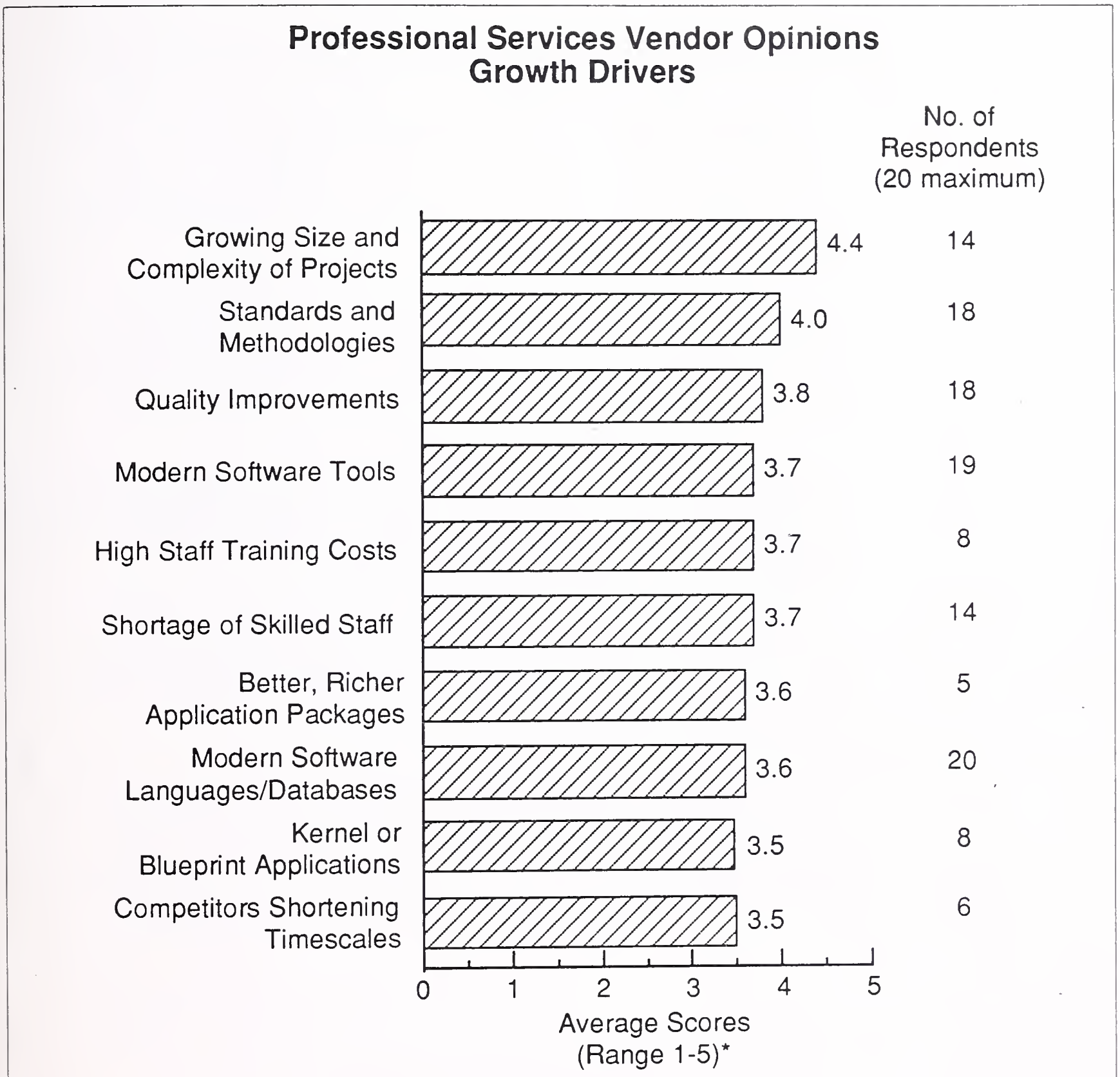
particularly for complex large-scale projects where systems integration contracts are typically placed. This corresponds directly with the vendors' view that complexity is the most significant driver of growth.

EXHIBIT III-9



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Ninety percent of respondents were very positive about the gains they were making by enforcing the use of standards and methodologies among their own staff. Many had found that their clients were also keen to adopt vendors' procedures for their own use. Particular mention was made of project management procedures and change control procedures.

The messages on quality, which have been widely discussed in the last two years, are now being reflected in the marketing stance of vendors interviewed. The vendors were not questioned on their ability to measure quality improvements. A "quality" culture is now seen as an essential part of a vendor's competitive armoury. Thirty percent of those interviewed were concerned that they had not made sufficient progress on actual quality improvement, even though their clients may be unaware of this.

The introduction of better, richer application packages was seen as creating more professional services opportunities by only 30% of respondents. However, as shown in Exhibit III-10, which shows the analysis of perceived inhibiting factors, 45% saw packages as a threat to professional services growth.

Some respondents expect their own use of kernel or blueprint packages to stimulate more professional services business. They saw this as a way of improving staff productivity, rather than as a way in which clients could develop their own solutions more rapidly.

In Exhibit III-10, the most obvious inhibitor of professional services growth appears at the top of the list—reduced client budgets. Seventy-five percent of respondents admitted to experiencing reduced revenues from a significant number of clients.

Nearly half of the respondents felt that the high cost of training their staff was limiting their professional services business growth. Only one respondent quoted a figure—7% of turnover—for staff training costs. This relatively very high figure was quoted as a reason for the company's success in the market.

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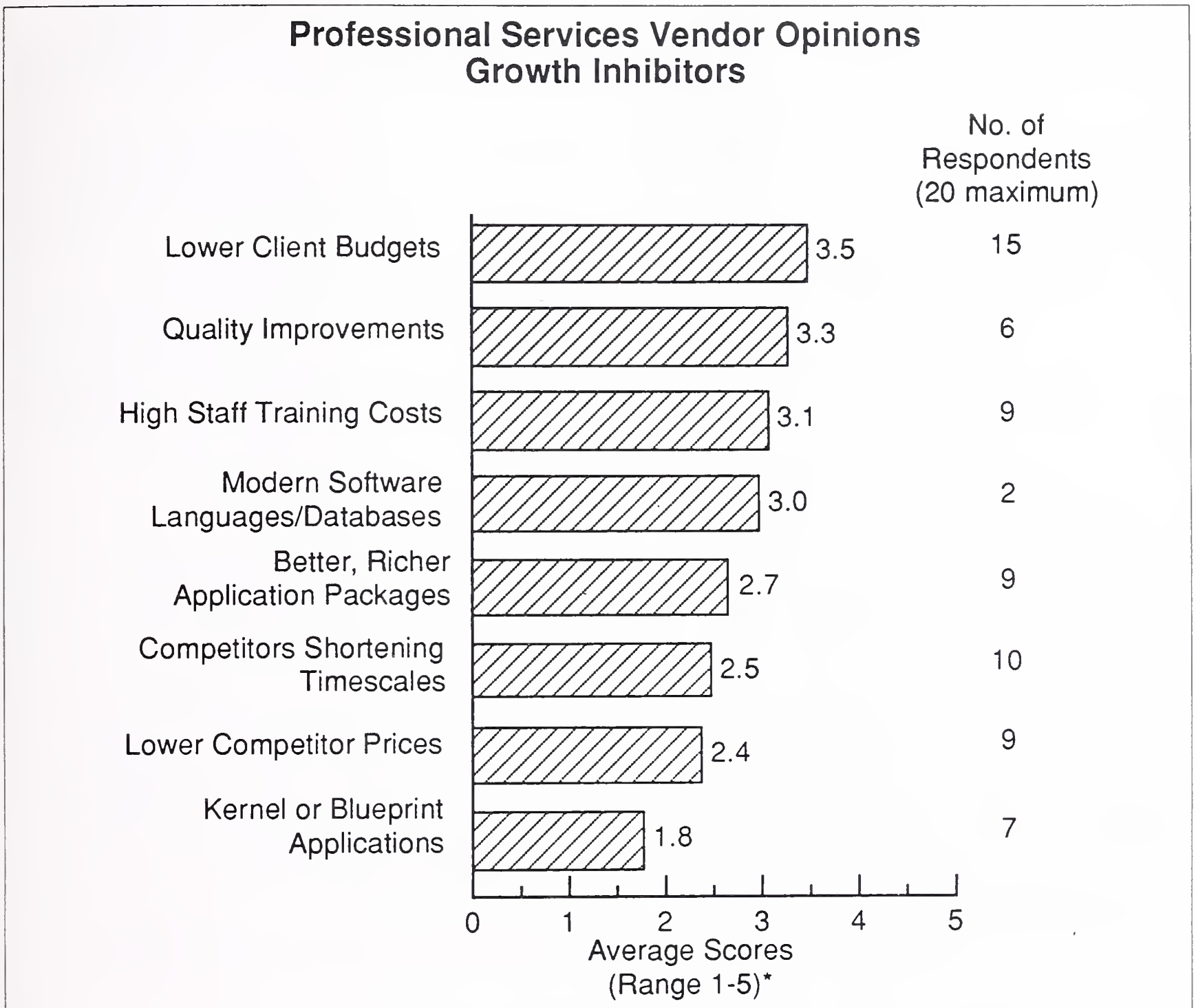
EXHIBIT III-10



2. Systems Integration Trends

The major driving force behind the initiation of systems integration projects is the client's commercial environment. However, it is the combination of commercial pressures and the technology now available which is giving rise to the types of projects that are now prevalent, many of which have a high networking content.

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Companies which undertake systems integration projects typically require a major transformation in their business practices in response to the combination of market and financial pressures. This is particularly true for the European manufacturing sector, which is more exposed to global competition than many other sectors of industry.

Because major projects typically arise in companies facing severe competitive pressures, some systems integration vendors focus almost exclusively on industries which they perceive to be undergoing radical change.

Apart from the emphasis on cost reduction, a typical response by organisations facing these pressures is to try to improve their responsiveness to their clients. In many cases, this is leading to a restructuring of organisations with the emphasis on improved internal communications—often via flatter organisational structures—and improved links to clients. This approach requires information to be readily available on a need-to-know basis within the organisation.

For example, within the manufacturing sector there is currently an emphasis on supply chain integration. Greater supply chain integration is expected to shorten customer lead times and to provide customer contact personnel with immediate access to up-to-date order status information.

This emphasis on information flow and accessibility within organisations leads to a requirement to establish a technological infrastructure which will support such plans. Accordingly, some vendors report that there is currently less emphasis on applications within the systems integration market. The top priority for some users is to establish a platform which facilitates the flow of information around the organisation.

These trends lie behind the responses of vendors, shown in Exhibit III-11, which reported the following to be important driving forces behind systems integration projects:

- Migration to open systems.

- Need to link heterogeneous equipment.

Of course, the factors discussed so far only explain why the project is appropriate to the company's business; there still remains the question of whether to outsource or perform the project in-house. Here there are two main factors, again identified in Exhibit III-11. These are: resource and skill deficiencies in-house.

Communications have long been an area in which in-house information systems departments have been comparatively short of expertise, and vendors are finding that users often lack the technical skills necessary to link heterogeneous equipment from a range of vendors. Users are also

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reluctant to increase the staffing of their information systems departments to cater for one-off systems integration projects. The necessity for speed of implementation also contributes to the trend to outsourcing.

EXHIBIT III-11

Key Driving Forces
Systems Integration, Western Europe

Factor	Level of Importance
Lack of in-house technical capability	Very High
Lack of in-house IS resources	High
Migration to open systems	High
Need to link heterogeneous equipment	High

Finally, a significant factor behind outsourcing is the desire to transfer risk—whether technical or political—and large systems integration projects are especially high risk in nature.

Some of the factors which vendors believed to be of minor importance are shown in Exhibit III-12. Firstly, cost-cutting is not perceived to be a reason for outsourcing systems integration projects. Indeed, both vendors and information systems departments typically believe that projects can be more cheaply, if not more effectively, implemented in-house. Where systems integration projects are outsourced, the elimination of risk (both financial and technical) and the reduced timescale may outweigh the extra costs incurred. However, in many cases, this debate will not arise since the in-house capacity or skill base is insufficient.

Interestingly, vendors still do not perceive a major change taking place in the role of information systems departments leading to them taking a more strategic perspective and adopting increased acceptance of outsourcing. Skill and resource shortfalls remain the major reasons for outsourcing, not a fundamental shift in attitude towards coordinating third parties to achieve company goals. However, vendors do recognise that information systems managers now fall into two categories: those primarily concerned with technology and its implementation, and those that adopt a broader, business-oriented perspective. Systems integration vendors remain concerned that managers in the first category see themselves as in competition with vendors and are very reluctant to accept outsourcing. Those in the second category are viewed as more amenable to the use of outside vendors.

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EXHIBIT III-12

Key Driving Forces
Systems Integration, Western Europe

Factor	Level of Importance
Cost-cutting within IS department	Low - Medium
Changing role of IS department	Low - Medium
Downsizing of systems	Low - Medium

D

The Buying Process

Exhibit III-13 indicates the perceived importance of each category of user personnel in the buying process for systems integration projects, as viewed by vendors.

It is widely acknowledged that most systems integration projects are initiated and purchased by senior user management. Some vendor comments reflecting this include:

"Systems integration is a main board-led market."

"Market pull from the CEO is important."

"Most projects come from above the information systems departments."

"The key success factor is to get as high as possible, as quickly as possible."

However, as can be seen in Exhibit-13, it is the management consultancies and the equipment vendors that are having the greatest success in generating systems integration projects via board-level personnel. The professional services vendors are typically less skilled in gaining access to user top management. For them, information systems management remains the primary contact, though they also report high levels of contact with user middle management.

Exhibit III-14 shows the level of importance attached to the various categories of "sales" personnel by systems integration vendors.

Overall, account managers are regarded as the most important source of leads, and the nature of personnel used and the role played by them is changing to reflect this. Firstly, it is widely recognised that a greater seniority and maturity of account manager is required now to liaise with

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those major clients likely to be the source of systems integration projects. One vendor reported that only sales managers and senior staff had the business knowledge and maturity to liaise with user top management in a consultative capacity.

Since account planning is now taking on a very important role in business development, it is no longer the preserve of the sales force. Many vendors expect account plans to be discussed extensively within their organisations to ensure that any possible opportunities are exploited. Account managers are also expected to involve business partners when this could assist in account development.

Currently, external consultants are regarded as contributing less to business development than either account managers or new business sales forces. However, there is a recognition that the role of true business consulting is growing in importance and that external consultants will play a larger role in lead generation for systems integration projects in the future. This is reflected in the following comments from vendors:

"We need partners with upstream capability."

"The big consultancies will become more important."

"More and more companies are using consultants to prepare invitations to tender."

EXHIBIT III-13

Key Players in Buying Process
Systems Integration, Western Europe

Player	Vendor Type		
	Equipment Vendors	Professional Services Vendors	Management Consultancies
Client board-level personnel	High	Medium	Very High
Head of information systems	High	Very High	Medium
Client middle management	Low	High	Medium

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EXHIBIT III-14

Key Vendor Personnel in Lead Generation Systems Integration, Western Europe

Personnel	Level of Importance
Own account managers	High
New business sales force	Medium - High
External consultants	Medium
Third parties	Medium

Some of the key influences on the buying process for systems integration projects are identified in Exhibit III-15.

For many of the equipment vendors, their best chance of success in the systems integration market lies in exploiting the major accounts within their existing customer base. Account management and control remains the key. The major tools used by the equipment vendors to assist in account development are management workshops.

Typically, these are aimed at involving senior user management, identifying their business strategies and critical success factors, and suggesting ways in which information systems could be used to support these strategies. Industry and functional experts are extensively involved to lend credibility to the vendor's suggestions.

The management consultancies often generate systems integration projects as a direct result of business consultancy studies or audits. It is increasingly common for business consultancy studies to generate an immediate need for related information systems strategies and subsequently information systems projects.

EXHIBIT III-15

Key Influences in Lead Generation Systems Integration, Western Europe

Factor	Level of Importance
Business consultancy studies or audits	High
IS strategy studies or audits	High
Management workshops involving end-user management	Medium

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Risk and Programme Management

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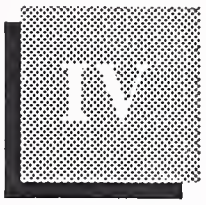

Risk and Programme Management

A Introduction

The steps to success as a systems integrator require the creation and imposition of careful marketing, opportunity qualification, disciplined bid preparation, and established programme management practices. Diligent competitor evaluation, continuous pre-sales development and creation of a committed team in-house and with partner/alliances are essential to achieve the rewards of completed systems integration projects. Vendors must also diligently assess, manage and contain the inherent risks. These are not one-time activities; rather, they entail constant monitoring of the systems integration plan and its execution.

The following sections of this chapter address these challenges.

The risks to both users and vendors are considerable in undertaking systems integration projects, as shown by the very public failure of a number of government projects. Indeed, it would be unreasonable to expect all systems integration projects to succeed, both in terms of providing the correct functionality and in keeping strictly to budget, given the pioneering nature of many of these projects. In some instances, systems integration projects are only contracted out to vendors because the users regard the project as too high a risk for them to handle. The nature of this risk may be either technical or political.

For a systems integration project to succeed, it needs to meet the following criteria:

- To satisfy the business need for which the project was initiated to the user's satisfaction.
- To be completed on time.
- To be completed within budget.

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Of course from the vendor's point of view, the project should also be profitable. It has been estimated that up to 25% of systems integration projects fail to meet this last criterion.

The principal risks encountered by vendors in systems integration projects are listed in Exhibit IV-1. The ways in which vendors seek to minimise these risks are discussed in more detail later within this chapter. Overall there was a high degree of agreement amongst vendors on the nature of the risks which arise in the course of a systems integration project.

To analyse how risks can be minimised, the discussion is broken down into three main stages, namely:

- qualification stage
- proposal stage
- systems development.

EXHIBIT IV-1

The Principal Risks
Western European Systems Integration

- Customer requirements unclear
- Pricing
- Partner's commitment and performance
- Resource exposure

The risks encountered at each stage will be analysed. In practice, there will typically be some degree of overlap between these stages.

B

Qualification Stage

1. The Sales Process

The contract acquisition process is vital to a vendor not just because business must be gained, but because it establishes the foundation for the successful completion of projects. Future success and profitability are a function of the percentage of failed projects, projects that overrun their planned costs and eat into the average business margin. In a competitive market—both for the business and the human resources to staff projects—vendors do not have the options of raising their prices or lowering their salary bill to improve their margins. Vendors have to

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learn rapidly from any past mistakes and continuously increase the proportion of successful projects. Systems integration project contracts must incorporate an element of cost to cover the risks assumed by the vendor taking responsibility for the development and implementation to a fixed price and timescale.

The pre-sales phase is a period of considerable importance. The vendor must carefully evaluate the risks involved and prepare a bid, which is, in effect, a calculated gamble, constrained externally by competitive forces and internally by the vendor's technological and management skills. From the clients' perspective, the decisions and commitments that are made during this phase will shape the clients' expectations and establish a basis for the overall measurement of success.

In response to the critical demands of the pre-sales phase most vendors have established processes and procedures to identify and qualify systems integration opportunities and to develop responses with a high probability of being profitable.

2. Opportunity Identification and Qualification

The principal aims of a vendor during the pre-sales phase, are to improve the chances of winning the contract and minimise the costs involved in bidding and submitting a proposal. Bid costs are usually very high for systems integration contracts and it is, therefore, very important to establish an overall view at an early stage of the chance of success. In circumstances in which a vendor does not feel that it has a very good chance of success, it is prudent to withdraw before considerable costs and personnel are committed to the project.

SI vendors need specific internal procedures for identifying and qualifying systems integration project opportunities. Projects can be identified from professional services contracts for project specifications and study contracts. Increasingly, the vendors that get these contracts gain considerable competitive advantage at the development and implementation phases because of the project knowledge embedded in the initial consultancy.

The increasing complexity of systems is driving a trend towards longer-term, more continuous relationships with third-party vendors. The vendor develops a repository of project and client knowledge, which it is in the client's interest to retain by maintaining the contract.

Vendors will also engage in target marketing: identifying particular industry sectors or cross-industry applications in which they can engage their specific knowledge and experience.

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The initial risk to the vendor is in the decision whether or not to submit a proposal. The costs of tendering for systems integration projects can be very high. For some government contracts, pre-sales costs of millions of dollars can be commonplace. Accordingly, vendors have to make a considerable commercial judgment as to whether they wish to proceed or not very early in the project life cycle. Most vendors have a formal review process which ensures that such decisions are well considered, and that a decision to go ahead has the approval of vendor management commensurate with the size of investment being made at the pre-sales stage.

This review process typically involves:

- Making a judgment about the true business worth of the project to the client.
- Taking technical risk into account.
- Evaluating the possible levels of profitability of the project under various scenarios.
- Evaluating the likelihood of success of the proposal.

3. Business Value of Project

The single most important cause of failure in systems integration projects reported by vendors is the client's lack of understanding of their own requirements. In the worst instances, this can lead to the systems requested by the client being inappropriate to meet their business needs. In less extreme cases, any specification supplied by the user may have significant omissions or no clear cut-off point.

The steps vendors can take to endeavour to minimise occurrences of these problems are shown in Exhibit IV-2. Firstly, the vendor's prospect qualification process must ensure that there is strong business justification for the project proposed. The vendor should involve his own business consultants to the extent necessary to guarantee that the system proposed is not just kite-flying or love of technology for its own sake. The project must provide real benefits to the client's operation of his business and fully support current business strategies. The level of return on investment from the project should also be clearly identified. Any projects that do not have a strong business rationale are likely to be abandoned as this becomes apparent during the development stage, causing considerable financial embarrassment to user and vendor alike.

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EXHIBIT IV-2

Risk Management—Customer Requirements
Western European Systems Integration

- Business-oriented prospect qualification
- Involve business consultants
- Check acceptance criteria
- Client involvement

When projects appear ill-founded to vendors at this early state, they are well placed to either suggest alternatives which will assist the user organisation in meeting its real business goal or pull out of the project completely.

In addition to a clear business justification, each systems integration project must be well-defined with clear specification and acceptance criteria. Change control mechanisms should be established to monitor any deviations from the specification as the project progresses.

4. Technical Risk

Technical factors are another major source of risk, especially if the project requires an element of technical pioneering. The vendor's level of experience in similar projects is probably the key factor in determining the size of the risks at this stage.

When new ground is being broken technically, the vendor should ensure that a number of alternative technical fall-backs are available as a contingency measure. It is best to use proven technology and techniques whenever possible.

Apart from innovation, the other major source of technical risk is system performance. Vendors try to avoid performance commitments—response times, number of concurrent users—whenever possible, but in many cases the user will insist upon certain criteria being met.

Vendors try to minimise the risks inherent in such commitments by techniques such as prototyping. Some potential projects will be so technically advanced as to invite the question, "Can it be done?" For these projects, an investment in engineering a prototype may be required. If the prototyping requirement is expensive, the buyer may be willing to

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underwrite the cost, unless the buyer believes that the prototype could be used by others. However, performance analysis remains an imprecise science and so previous experience remains the best guide as to the performance levels which can be achieved in practice.

5. Competition

Typically, vendors aim to win one in three of the systems integration projects for which they bid to prevent their overall tendering costs from getting out of control. This means that an assessment of the vendor's chances of winning each project must be made before major expenditure is incurred in submitting a proposal.

Accordingly, vendors typically incorporate a competitive assessment of their rivals into the risk management procedures for each project. Overall, the probability of winning the contract together with the expected profitability of the project must give an expected value sufficient to justify bidding costs.

In extreme cases, if a vendor believes that a competitor is a strong favourite to win a project or the prospect is simply going through the motions to appear to be impartial, then the vendor is likely to decline to tender.

In one firm it is necessary for that business case to be supported by unique reasons why the contract will be won, and to prove this to an evaluation board of senior executives. At the very least, the vendor must carefully evaluate the strengths and weaknesses of the competition and its probable ranking in terms of likelihood to be awarded the contract. Unless a vendor is sure to be considered at least in the top three competitors, the vendor would be well advised to walk away before investing precious money in a "can't win" situation.

Vendors can also employ analytical approaches to assist in the qualification process, including quantitative assessment to aid the bid/no bid decision. These will tend to focus on areas such as customer commitment to the project, competitive assessment of technology, skills, products, costs and prices, as well as assessing the risks associated with all aspects of the programme.

Regardless of the exact approach used, every vendor attempts through this qualification process to improve the probability of gaining the contract and minimise the overall bidding and proposal costs to the firm.

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C

The Proposal Stage

1. Project Specification

The proposal or bid preparation process begins with some indication, in the commercial sector often informal, that a prospective client intends to award a contract for the implementation of a system. Proposals for systems integration not only respond to the customer specifications, but also become the blueprint for vendor implementation. How effectively this step of the buying process is executed often determines the success or failure of the client's project and the ultimate profitability of the vendor's business proposition. The proposal represents, to the client, the vendor's understanding of the client's requirements and the vendor's proposed solution, usually at a fixed price, for the client's business problem.

It needs to be recognised that frequently commercial systems integration clients are unable to provide the bidding vendors with a complete specification, thus rendering the task of proposing much more difficult. One of the strategies used to address this situation is to establish a separate contract to develop the specification or to develop the specification jointly with the client as part of the proposal process. A strategic decision needs to be made by the bidder, in the absence of formal definitions, to establish what the client wants, needs and is willing to pay for. At the very least, vendors should develop a detailed check-list of generic tasks associated with the SI project. This check-list can be used in early conversations with the client to discuss what the project entails and whether the integrator or the IS staff is to take responsibility for each individual task.

Certainly the whole pre-sales cycle must be geared to developing a thorough understanding, probably superior to that of the client's staff, of the needs and requirements of the project. This cannot be achieved in a limited timeframe. The vendor must invest in this protracted process, which will pay dividends when the proposal process is actually underway.

This early participation in a consultancy role has the additional advantage of establishing a level of comfort between contractor and client. This strategy can backfire, however, if the competition can convince the client that this step is unnecessary and a waste of time and resources.

The main danger lies in requests for proposals (RFPs) which have been developed either by the user or by an independent management consultancy on the user's behalf. In such cases, it is not uncommon for requirements to be inadequately defined, and the vendor should be diplomatic in persuading the prospect that further investigation is essential before a firm commitment can be made by either party. Again, it is also important for the vendor to be confident of the business relevance of the system which is the subject of the RFP, regardless of the clarity of the specification.

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There are notable instances of vendors developing systems precisely to specification only for the specification to be subsequently found to be flawed. While the vendor may still be paid in such circumstances, the vendor's relationship with the client and professional reputation are at considerable risk.

In cases when inadequate information is provided in the RFP or there are other unknowns, it is a good practice for the vendor to document all of the assumptions that were made in the preparation of the proposal.

2. Pricing

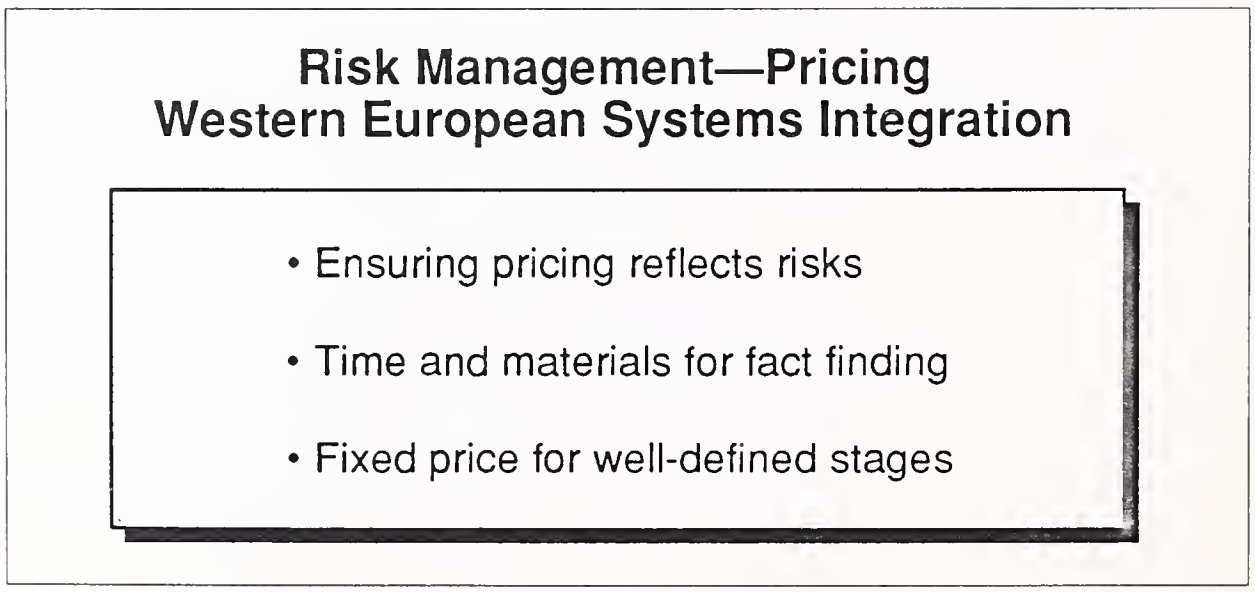
There is always a risk in systems integration projects of incorrectly estimating the cost of development and hence the price to be quoted to the prospect. It has been estimated that this leads to project losses being incurred by vendors on up to 25% of systems integration projects. This is particularly true since most users expect systems integration development work to be conducted on a fixed-price basis. Indeed, some vendors are very aggressive in their adoption of fixed-price pricing strategies.

The means by which vendors endeavour to minimise their pricing risks are listed in Exhibit IV-3. In general, the price must reflect the level of risk perceived by the vendor for each project. This was expressed by one vendor as:

> *"If the client can live with a degree of uncertainty (in the price), then more of his money goes towards systems functionality."*

The converse is also true. If a user insists on going fixed price on an imprecise specification, then the vendor—even if he accepts the challenge—is likely to build a considerable contingency premium into the price quoted.

EXHIBIT IV-3



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In practice many vendors encourage consultancy and fact-finding investigations to be conducted on a time and materials basis. However, there are signs that this is starting to change and even consultancy studies are increasingly performed on a fixed price basis or against an upper limit of man-hours. Even consultancy studies can be a "fuzzy" deliverable. So it is important even here to maintain an open exchange of ideas between client and vendor throughout the study, so that the client is not presented with any sudden shocks at the end of the study. Vendors also find it useful to hold some allocation of time in reserve to cater for any re-work or small additional investigations which need to be carried out.

As opposed to adopting either a fully time and materials or fully fixed-price approach to systems integration projects, some vendors seek to protect themselves by taking a half-way approach when specifications are inadequate or incomplete. The programme is divided into separate phases to reduce the risk for both parties. The latter phases are not proposed or contracted until the initial specification phase is competed. The half-way approach typically means that a fixed price is only adopted for the next stage of the project and not for the project overall. In such cases, vendors will supply the client with overall cost estimates for the project which are for their budgetary purposes only and are not contractually binding.

3. Partners

The partner used by the prime contractor within a systems integration project is another major source of risk. The means adopted by prime contractors to minimise this risk are listed in Exhibit IV-4. In the majority of systems integration projects, the prime contractor is responsible for the management of subcontractors. Indeed, these subcontractors have typically been selected by the prime contractor and may be completely transparent to the users.

The principal sources of concern with partners include:

- their performance
- their commitment to the project.

Performance risks are typically minimised by vendors through a combination of strict procurement rules and familiarity with the partner. As commented by a vendor,

> *"Partners you have worked with before (in a particular role) tend to be short-listed."*

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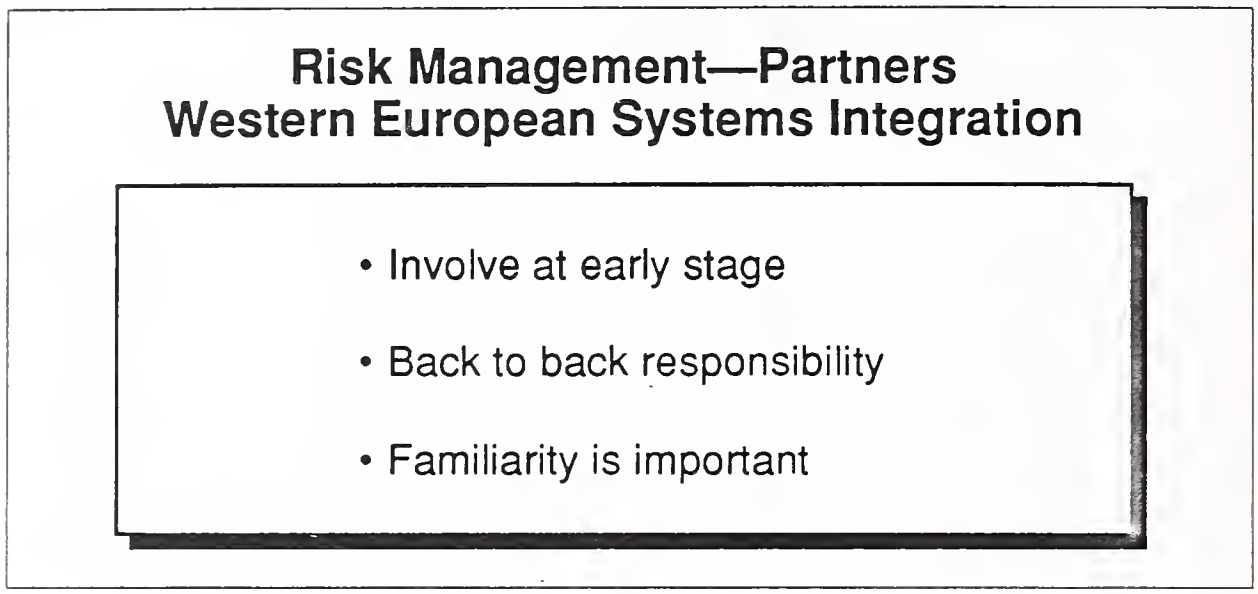
In order to retain access to these key partners, vendors are increasingly negotiating long-term commercial agreements with them. Such agreements tend to be broad statements of intent rather than detailed and legally binding. However, for partners well downstream in the development process, more specific contracts can be signed committing the parties to mutually agreed charge rates and utilisation levels.

EXHIBIT IV-4



Some systems integration vendors also have partner support programmes to help them tie in favoured partners.

Overall, vendors are very keen to maintain continuity of partners. Such continuity assists in developing effective working relationships and so increases both the vendor's confidence in, and likelihood of, achieving a successful implementation.

Some vendors have strict rules for the selection of new subcontractors. These rules typically place the emphasis on minimising risk of failure. Accordingly, vendors with innovative software products or technologies are unlikely to be favoured unless these products have already been well proven. In the case of systems integration projects, vendors have even less enthusiasm for pioneering than users. Accordingly only partners who can demonstrate a good track record are in demand.

In terms of risk sharing, subcontractors tend to receive a fixed-price contract from the prime contractor mirroring the deal between the prime contractor and the client. There is little likelihood of a partner being paid if its performance is poor and it has to be replaced by the prime contractor during the course of the project. This can occur.

It is very important that the prime contractor works closely with its partners at the proposal stage and is open and honest in its approach to them. This is because the partner also has to make a commercial judgment as to whether to bid, and to identify its own probable return on investment.

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Bidding for a large project may cause more financial hardship for a comparatively small subcontractor than for the prime contractor if the partner is unused to committing significant pre-sales expenditure. Such pressures may cause the partner to pull out part way through the proposal stage as the company's pre-sales expenditure mounts. The partner may also take a different view of the likelihood of winning the contract or its overall profitability from that taken by the prime contractor.

Partners pulling out of proposals is a significant problem for vendors. It is probably best avoided by developing close working relationships between prime contractor and partners and keeping partners well informed of all developments. It is also advisable that the necessity for, and scale of, their pre-sale costs are clearly indicated to partners during the selection process, along with a realistic indication of the probability of winning the contract.

4. Programme Manager Involvement

Most vendors attempt to involve the programme manager in the proposal process, with responsibilities ranging from reviewing and approving the overall system architecture, staffing and terms and conditions through to preparing schedules, detailed systems design and configuration and being the proposal manager.

The decision to include the programme manager in the proposal process is a difficult one for some vendors to make, as programme implementation skills are a precious resource. Yet most vendors agree that the odds of successful implementation are increased when the programme manager is implementing a proposal that he/she authored.

The ability to manage the performance phase of an SI programme effectively depends on how completely programme management disciplines are considered during the proposal process. Completing the business acquisition process thoughtfully, and including the programme manager in it, should pay handsome dividends when the time comes to manage the implementation process.

5. Additional Considerations

A number of additional areas also need attention at proposal time to reduce the vendor's implementation risk during the performance phase, and these are listed in Exhibit IV-5. They include managing the client's written and unwritten expectations, and ensuring that the statement of work, contract terms and conditions and change management process are well understood and agreed by all parties, particularly the client buyer and user. It is also important to ensure that end-user personnel have concurred with the defined programme deliverables.

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EXHIBIT IV-5

Proposal Process—Factors That Impact Programme Management

- Setting client expectations at reasonable levels
- Availability of right resources to complete proposals
- Customer user personnel concurrence
- Statement of work
- Terms and conditions
- Change control mechanisms

With decision making placed higher in the client's executive management and in user organisations, the vendor needs to increase exposure at all levels in the client's organisation. Clients typically need to be sold on the vendor's knowledge of the client's business problem and proposed solution, the vendor's overall capabilities, and the vendor's experience and success in implementing complex systems integration projects.

A summary of the key elements involved in developing an SI bid are shown in Exhibit IV-6. Clearly the investment required of vendors in developing a bid is substantial, perhaps involving 5% to 6% of the contract value. Significant amounts of time and money must be spent in understanding the functional requirements, technical specifications, time and financial constraints, business terms and conditions, other salient factors (internal politics, key decision makers, buyer perceptions), and the selection process and evaluation criteria to be used in the process.

Once these specifics are uncovered and understood, additional time and money must be expended on developing the bid. An assessment of in-house capabilities must be made with respect to the requirements, posing the question " What does the bidder bring to the project"? One must conduct an internal skills inventory and determine what skills need to be acquired, if necessary by means of alliances.

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EXHIBIT IV-6

Bid Development and Investment

- Requirement analysis
  - Wants versus needs
  - Functional solution
  - Feasibility
- Proposal basis
  - System architecture
  - Equipment and software
  - Delivery requirements
  - Acceptance criteria
- Staffing
  - Project management
  - In-house staff
  - Outside skills needs
- Environment
  - Installation
  - Training
- Costing
  - Labour
  - Materials
  - Mark-up
- Competitive analysis
- Competitive pricing

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Review and screening processes are a vital part of the pre-sales process. Exhibit IV-7 lists some of the types of processes employed by SI vendors. Vendors should review all technical aspects of a proposed project through a formal review board. Additionally bidding teams will present the business core for each request for proposal (RFP) to a senior executive.

EXHIBIT IV-7

Pre-Sales Review Process for SI Projects

- Technical review
- Executive review
- Screening committee
- Quantitative commitment analysis
- Competitive assessment

1. Programme Management Objectives

The programme management function is a major challenge for vendors. The systems integration business is fundamentally concerned with the assumption of responsibility (and thus the accompanying risks) for client's major systems development projects. The need for strong project management has already been referred to in this report and is specifically addressed in this section.

Strong project management skills are critical to managing and containing the inherent risks in the systems integration business. Vendors need to have a deep understanding of the theories, techniques and supportive tools necessary for managing successfully their systems integration business. These methodologies and tools are embodied by SI vendors into formal programme management systems, not to satisfy client reporting or contract requirements but to meet the internal management needs for handling major projects.

One of the important challenges for vendors is the establishment of a programme management system of appropriate scale. Systems necessary for very large defence projects valued at several hundred million dollars are not economically viable for a commercial project valued at several tens of millions of dollars. Vendors can experience problems with the

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transference of staff from the very large to the medium large environment. An experienced individual may operate effectively within a definitive programme management system but have difficulty when placed in an environment where he has wider responsibility and must supply his own level of checks and balances—previously provided to them by the system. Downsizing programme management systems presents the dilemma of selecting the "right" elements to dispense with.

The three principal measures of a successful SI programme are:

- On schedule.
- Within budget.
- Meets technical specifications.

The client considers the programme successful if the solution is provided on a mutually agreed-upon schedule, at the agreed-upon price, and with the functions that will meet the users' requirements. From the vendor's perspective this means ensuring that there is mutual agreement about the cost, the schedule completion data, and the detailed technical specifications, both at the time the contract is signed, and as a result of any specification changes that occur during implementation.

Exhibit IV-8 identifies the factors generally considered to be the most significant in determining either overall success or failure for a project.

EXHIBIT IV-8

Major Technical Management Factors

Success

- Well written, detailed, structured, consistent specifications and sign-off
- Understanding the customer's business needs
- Rigorous change control system

Failure

- Incomplete technical specifications
- Not containing programme scope

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First, a detailed specification is important for the technical success of an SI programme. A thorough understanding of the customer's business needs driving those technical specifications is considered equally important. This attests to the importance of business consulting in the overall SI process. INPUT believes that vendors who do front-end consulting will clearly have an advantage, not only in winning business, but in successfully implementing it.

The third technical management success factor is having and using a rigorous change control system that provides a vehicle for identifying, sizing and gaining vendor and client agreement to change.

The factors that are most likely to cause failure in the technical management of an SI programme are incomplete technical specifications or specifications that are continually moving as a result of what can be described as "creeping scope". Most of the well-published systems integration failures are a result of client and vendor inability to reach agreement on programme scope, or on a firm set of specifications. It is absolutely essential that the vendor and the client establish this "base line" of understanding. The base line then becomes the reference point from which changes are requested, sized and proceed, and schedule impacts measured.

Exhibit IV-9 identifies the factors that most impact the schedule of a systems integration programme. Perhaps the most important is the need for a realistic plan, one that identifies all of the elements of the implementation, that ties them together into a logical work flow, and that identifies dependencies. The second factor is a measurement technique that effectively tracks progress. One common approach for accomplishing this is establishing identifiable milestones that provide a means of quantifiable progress measurement.

It is also important to have a reasonable schedule, one that is achievable. Too often the desire to win the contract or satisfy customer requirements results in the establishment of unrealistic schedules. Including the programme manager in the proposal team, which was discussed earlier, should help in this area. Few good programme managers are likely to propose schedules that they cannot personally meet.

The final factor is accurate schedule estimates. These generally result from understanding the complexity of the activities in the programme and employing good estimating tools and techniques.

The three factors most likely to result in poor schedule management are creeping scope, poor or overly optimistic estimates and unrealistic customer demands. In the high stakes game of fixed-price contracts, it is often more prudent to walk away from an opportunity than bid to an unrealistic schedule on a programme with a scope that is a moving target.

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EXHIBIT IV-9

Major Schedule Management Factors

Success

- Realistic plan
- Measurement technique/milestones
- Reasonable schedule
- Accurate estimates

Failure

- Not controlling scope
- Poor or optimistic estimates
- Unrealistic customer schedule

Exhibit IV-10 identifies the major factors that influences cost management. Again adequate requirements definitions, realistic programme plans and rigorous change control systems are important. Additionally cost tracking and monitoring systems and completion and acceptance criteria are important factors.

For cost management success the programme has to be structured so that activities can be identified, budgets established for each activity, and then costs allocated to these activities as the work is accomplished. This "work break-down structure" is essential to successful cost tracking and monitoring.

Another protection against cost overruns is to establish completion and acceptance criteria as part of the original contract. Completion criteria identify precisely what deliverables have to be installed, and acceptance criteria identify the work that the system has to perform to meet the contract specifications. If these criteria do not exist, it may be impossible to prove when the project is complete, and the client may either refuse to pay or demand that additional functions be added to the system.

Vendors should also use financial reserves to protect against cost overruns. The vendor establishes a "should-cost" model based on the estimated schedule, cost, and proposed technology, and then adds a protection factor or reserve to cover the risk and potential problems in the programme.

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The factors that were identified most often as causing failure in managing programme cost are also listed in Exhibit IV-10 and have been identified and discussed as either technology or cost factors.

EXHIBIT IV-10

Major Cost Management Factors

Success

- Adequate requirements definition
- Tracking and monitoring system
- Realistic program plan
- Completion/acceptance criteria
- Change control
- Financial reserves

Failure

- Creeping scope
- Poor planning and estimations
- Lack of detailed specification

2. Risk Management

Most system integration programmes contain a significant amount of risk. The vendor is committed to provide the technical solutions promised, on schedule and at the agreed cost. There are two important disciplines that can assist fulfilling these commitments. They are the use of risk management techniques, and a rigorous change management system.

Most SI vendors employ formal risk management techniques on systems integration projects. Some of these are identified in Exhibit IV-11. They include both tools and processes. Examples of the tools than can be used range from a bid/no bid model to proprietary models to assist in identifying and assessing risk in planning, design, implementation and overall management of a programme. Other tools include models to assess the impact of changes, and calculations to assist in determining the likelihood of meeting schedules and cost objectives.

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In addition to the models described above, reviews are also excellent vehicles for providing management with either regular or one-time assessments of the status and the risk position of an SI programme. These reviews range from regular internal and external management reviews to special audits. The employment of reviews by the vendor provides an effective vehicle for communicating status and risk within the vendor organisation.

EXHIBIT IV-11

Risk Management Tools and Reviews

Tools

- Bid/no bid models
- Risk assessment models
- Change impact models
- Budget/schedule likelihood calculations

Reviews

- Regular progress reviews
- Internal quality control reviews
- Independent quality assurance reviews

Key elements of the risk containment process are:

- Risk varies with project size, complexity, client sensitivity.
- Risk needs to be shared with subcontractor.
- Sensitize all levels of company to risk management.
- Use liability insurance coverage.
- Assess risk level during bid preparation.

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3. Communications and Change Management

Good communications is one of the strongest elements that contributes to overall programme success. Successful negotiation of changes to the specifications, schedule or costs are dependent on understanding, agreement and communications among all of the parties involved in the programme through an effective change management system. User requests for changes to specifications and vendor approvals should be in writing and include projected impact on project schedule and cost.

Having established before systems development commences that the project provides real business benefit to the client, and having achieved a mutually agreed clear specification of requirements, it is only at the development stage that the veracity of this position can be established.

One warning sign that the specification is not as appropriate as was initially believed is a large number of change requests from the user.

However, as one vendor commented *"life is a moving target"* and ideas are bound to evolve as development progresses. Accordingly a certain level of change is to be expected and even welcomed. What is essential within the change management process is that:

- All proposals for changes are jointly reviewed by user and vendor personnel.
- The implications of the business justification of the project are clearly identified, and any changes are cost justified by senior user personnel.
- Any changes agreed must be formally signed off at the appropriate level of authority by both vendor and user.

Most vendors will ask the client to provide a single point of contact, someone who will serve as a dedicated project director. They will recommend that this individual also have the authority to make programme related decisions.

It is mandatory that the user becomes actively involved in managing the project. Any lack of accountability or involvement by the user is a major source of project failure.

If the person appointed lacks the necessary authority within the user organisation or fails to feel a high level of ownership for the project, then vendors will request a replacement from within the user organisation. It is especially important that the project director can appreciate the true business relevance of any changes proposed, and weed out any proposals that cannot be cost justified on commercial grounds.

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One aspect of project management frequently overlooked by contractors is the need to vest contract authority in the project manager. In time-critical projects, layered management can impede the schedule and add unnecessary risks. The results of assigning responsibility to a single manager who can act quickly far outweigh the risks of project delays and cost overruns. This is one of the main reasons why major vendors are moving implementation resources closer to the customer.

Another aspect of management frequently neglected in SI-type projects is the need to manage the user. The contractor does not want to be second-guessed on every decision. The user must be kept informed of the decision and convinced that the decision was the alternative that best met the user's interests. Management of the user also entails avoiding surprises. Formal and informal status reports must be made to various levels of the client organisation on a timely basis, to ensure ultimate acceptance.

Vendors that provide systems integration as a logical follow-on to business consulting prefer client contact at all levels of the business, rather than a single point of contact. This approach obviously gets all levels of the organisation involved and committed to the changes that are being implemented. Another view is to adapt the interface to the client's needs. This response, perhaps appropriate to hardware sales and installation support, may be much less effective when profitability is based on professional services activities that are based on a defined effort at a fixed price.

The importance of communications to successful systems integration cannot be emphasised too often. Vendor-internal, vendor-subcontractor and vendor-client communications are not only important to the overall management of the programme but also serve as important risk management tools. Exhibit IV-12 identifies the three major topics that need to be communicated among these three groups. They include programme status, necessary actions, and proposed and agreed-on programme change. These are the basic areas that can and will impact cost, schedule, and delivered function, and therefore there must be complete understanding and agreement on them.

Vendors employ a variety of techniques to communicate among the programme participants. Vendors employ reviews and reports to communicate within their own organisations and with clients. For internal communications, most vendors require regular reports on a weekly basis, and a monthly interval seem to be preferred for formal reviews. Monthly steering committee meetings are used as a means for communications between vendor and client, and subcontractors may be included in these meetings. Another interesting approach to communications that can be used is a newsletter that communicates the status, actions and changes to the programme and is distributed among all of the parties involved in the programme.

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EXHIBIT IV-12

Programme Communications

Tools
- Status
- Actions
- Change

Reviews
- Periodic reports
- Periodic reviews
- Newsletters
- Subcontractor manager(s)
- Programme workbooks
- Marketing representatives
- Informal communications

In addition to reports and reviews, marketing and sales representatives can be important in vendor-client communications. Hardware and telecommunications firms usually have large sales forces that are responsible for the day-to-day contact with the customer. The sales personnel responsible for customer satisfaction should be included in communications to and from the client.

Some vendors assign an individual or individuals the responsibility of being the subcontractor managers, particularly in large projects. The subcontractor manager becomes the single point of contact for all subcontractors, and is responsible for communication and managing the relationship with them. This is a full-time job in very large programmes. It requires a special set of skills. Some vendors have special training programmes to prepare individuals for these responsibilities.

Close management of partners is especially important to ensure that development is going to plan, and also that the partner is not about to cut his losses and abandon the project.

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Programme workbooks are also used as communication vehicles. These serve as a central repository for all programme documentation, including status, action and changes, as well as an audit trail for the complete programme. When kept properly updated, these documents provide a common point of reference for all parties involved in the programme.

Informal communications play an important role in successful systems integration implementation. A continual dialogue among all parties involved—vendor, subcontractors and client—is essential to successful systems integration programme implementation.

Failure to manage changes to the programme baseline is a common cause of programme failure or dissatisfaction. Change will almost always impact function, cost and/or schedule. It is therefore fundamental to good programme management to have an effective system to manage and control the introduction of change and to understand its impact. The principal components of a change management systems are listed in Exhibit IV-13.

EXHIBIT IV-13

Change Management System Components

- Written requests from clients
- Written cost and schedule sizing from vendors
- Vendor and client sign-offs
- Change tracking system

The change management system must include a formal change requesting process. Methods to accomplish this range from basic processes that require that all requests be provided in writing by the client's authorised programme manager, to more comprehensive approaches. An example of the latter includes the ability to request changes on two levels: exploratory, where only rough sizing is requested; or firm, where a firm commitment is provided.

The second fundamental element of change management systems is a written response from the vendor, which includes sizing the cost of the change, and the impact that it will have on the overall programme schedule. It is a good practice to examine alternatives to these changes and to assess the risk that the changes introduce. Both considerations should be included in the cost/schedule sizing process. Some vendors use models and automated tools to assist in this area.

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The third step of the change management system is to get both vendor and client sign-offs showing that the changes will be implemented. Some vendors and clients establish formal change review boards to determine if the proposed changes should be approved.

Finally, once approved, vendors generally establish change tracking systems to ensure that the change is introduced and incorporated into the programme. Automated tools are available and often used for change tracking.

4. Methodologies and Tools

Vendors have established processes for managing the various activities of programme management, and use automated tools to assist in the management of these processes. While the processes are relatively standardised, there appears to be no set of preferred or standard tools, with many internally developed and proprietary tools and methodologies available.

Although systems development methodologies were conceived originally as end-user-orientated and represented a standard business approach to projects, they have since become too technical for the end user. While great efforts are being made to improve the quality of the computer system, the lack of understanding of the real business problem leaves a serious gap between the real needs and the stated requirements. There is a tendency in the search for new business to commit to a project when the risks are still unnecessarily high. The opportunity to apply the methodology to a critical problem at the initial contract stage of the client-vendor relationship has been missed. This lack of business focus has reduced profitability and has been exacerbated by the change in client emphasis for projects to be more open-ended and commercial and less like the fixed administrative problems for which the methodologies were built.

Computer-aided systems engineering (CASE) tools are an important step in the struggle to improve quality and productivity, but the required link to methodologies may exacerbate the quality problem if the methodology is insufficiently client-oriented, thus making it even less flexible than before. Also, there is a tendency to view tools as a solution, without realising that significant investment is necessary to improve the capability of the users of the tools.

The categories of programme management tools are listed in Exhibit IV-14. Some vendors have systems integration methodologies that span the entire process from requirements definition to systems implementation, for example Andersen Consulting's FOUNDATION.

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These processes include design and analysis tools, project control, estimating and reporting systems, change management systems, and the use of CASE tools to provide an integrated programming environment. When total life cycle methodologies are implemented they are being promoted to provide a competitive advantage.

However, vendors employ standalone processes and tools that perform many of the elements included in the integrated methodologies. Thus, while common processes are being used to manage programme activities, there appears to be no industry standardisation in the area of tools and methodologies. This is most likely a result of the perception that this area can in fact provide the competitive advantage just mentioned. The lack of industry standardisation may also restrict the transfer of personnel from one firm to another, or from one development and implementation methodology to another.

EXHIBIT IV-14

Programme Management Tools and Methodologies

- Life cycle methodologies
- Development methodologies
- Schedule and event tracking
- Budgeting and budget tracking
- Change management and tracking
- Trouble reporting and tracking
- Communications
- Computer-aided systems engineering (CASE)

5. Project Managers

Qualified and experienced project and programme managers are a limited resource in most systems integration firms. The growth of the systems integration market will depend on the success of current and future programmes, and that success will depend on the competence and availability of programme managers.

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As new firms enter the SI market, they will need to develop the programme management disciplines and processes described in this report to be successful. But without good qualified programme managers to manage the implementation of the disciplines and processes, they will fail.

The job of programme managers requires a varied set of skills. It requires an individual who has a blend of business, technical, and if possible, functional skills. The business skills are required to control cost and schedule, as well as to resolve personnel and staffing issues. Technical skills are required to understand and manage complex technical issues, and functional skills are important in understanding both the client's application and industry requirements. Finding and employing individuals with all of these skills is indeed a challenge.

Exhibit IV-15 identifies the major internal and external sources for project managers. Organisations that have significant systems integration experience, generally companies with a strong professional services background, are able to develop their programme managers from former deputy programme managers, project or task leaders or from general analysts. Other internal sources for programme managers are business managers.

EXHIBIT IV-15

Project Manager Sources

Internal

- Promote from deputy programme manager, project leader, general analyst
- Exceptional technical personnel
- Business manager
- Development, sales or marketing

External

- Competitors
- Large users with PM experience

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External sources for programme management include competitors and large information systems users with programme management experience. Most vendors who hire from the outside look for senior consultant level personnel with over ten years of experience in programme implementation.

Some vendors have formal internal education programmes which range from project management classes to a full multi-year curriculum on the company's system integration methodology. Professional services companies generally offer more comprehensive training, most likely because they recognise that qualified professionals are their life-blood. They also tend to have well-defined career paths and use more advanced methodologies and tools such as CASE to motivate and retain qualified professionals.

Project managers are measured by programme success. Most are measured on timely programme completion, staying within budget and the customer satisfaction level. Another measurement approach would be on technical progress versus cost at intermediate milestones. Another approach is based on revenue, expense and profit whilst partners in accounting firms are typically measured on client service and satisfaction, quality and profitability.

6. Resource Exposure

Other major risks at the system development stage include:

- The availability of key development staff.

- Equipment performance.

There is always a danger that key development staff will not be available when required, and vendors need to adopt formal capacity planning techniques to ensure that such risks are minimised. Otherwise allowance must be made in the initial pricing which takes into account the necessity to hire-in staff.

A potentially more intractable problem is performance inadequacy of the equipment. Equipment upgrades may be the answer, but again, an allowance for this risk, or the transfer of this risk to the client, needs to have been made at the proposal stage.

Overall, it is hard to overestimate the importance of adopting formal risk management techniques prior to a proposal being submitted. These must attempt to identify and quantify the impact of all potential commercial and technical risks throughout the project. If this is done thoroughly, then vendor management is presented with a clear picture of the possible project outcomes and the financial implications of each. On this basis,

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decisions can be taken as to whether worst-case scenarios represent an acceptable level of risk, and if a decision is taken to proceed, what amount should be added to the proposal price to cover likely, or unlikely, contingencies.

Some systems integration vendors share their risk management assessments with the client. This is an excellent way of transferring the risk to the client. The client can be made aware of the potential pitfalls and helped to choose between low- and high-risk alternatives. In the case of high-risk alternatives, much of the risk can be transferred to the client who is now aware for example, of the possible need for additional hardware or of potential time and cost overruns.

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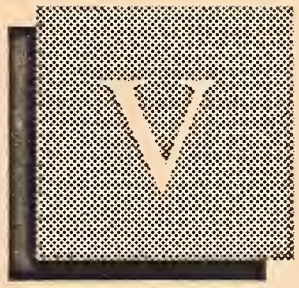
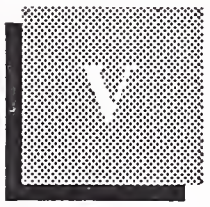


Vendor Alliances



Vendor Alliances

A Current Use of Partners

As the information systems industry has developed to deliver more and more complex and powerful applications to users, the demands placed on vendors has increased. It is no longer sufficient to simply meet the needs of major clients solely for equipment platforms or defined software application needs. Clients increasingly need vendors capable of providing a whole gamut of comprehensive services:

- Strategic consultancy that generates the information system application needs.
- Systems integration contracts that take on board the risks associated with developing and implementing systems.
- Operational support services that maintain and enhance the applications over time.

To meet these comprehensive and complex requirements vendors are being driven into alliances, partnering arrangements that provide access to the necessary knowledge, skills and experience to fulfil the client's needs.

Vendors need to have access to people with specific industry sector knowledge, affinity group knowledge and specialist skills in an environment in which these human resources are generally in short supply, difficult to recruit and retain. Vendors' alliances are a solution to gaining access to these scarce and necessary skills. Human resources are key to the future development of business, and it can be expected that organisations will have to review their own internal policies in respect of retaining older workers in contrast to the emphasis on youth that often prevails today. This will present a significant challenge, not only to management but to employees as well, since it will represent a significant reorientation of job roles, and work and career expectations.

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Exhibit V-1 shows a possible vendor positioning scenario. This diagram emphasises:

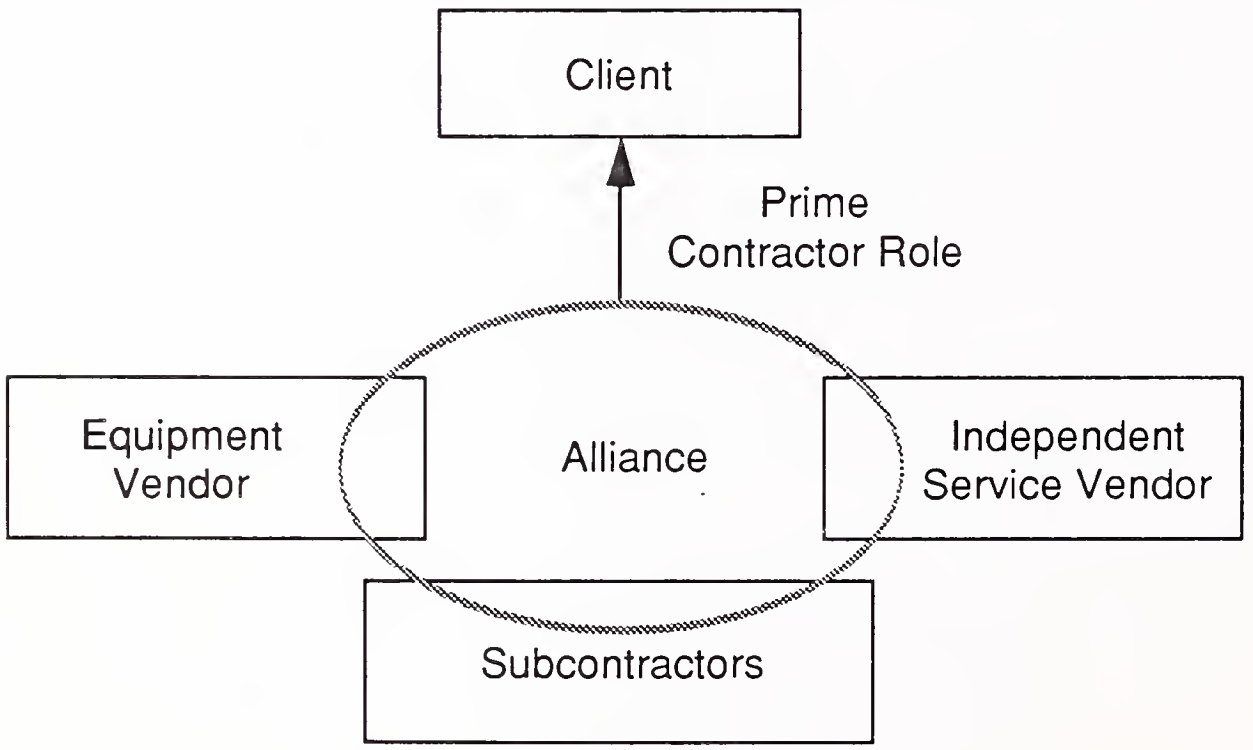
- The prime contracting role of either an equipment vendor or independent services vendor.
- The need for alliances.
- The need for subcontractors.

This scenario, a polarisation of vendor categories, is being driven as a direct result of the client need to build long-term relationships with systems management vendors. Within the equipment vendor group a further analysis could be made between:

- Computer Equipment Vendors.
- Telecommunication Equipment Vendors.
- Engineering Products Vendors.

EXHIBIT V-1

The Potential Role of Vendor Alliances



Another group of potential competitors, not strictly referred to in the above analysis, is that of the telecommunications services operators. Leading examples, already referred to in the previously section, being France Telecom, DBP Telekom, British Telecom, AT&T and Cable and Wireless. The independent network operators, for example, GE Informa-

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tion Services, could of course be classified as independent service companies in the analysis shown in Exhibit V-1.

This basic analysis can be extended further with a classification of SI vendors according to their core business. This analysis can provide an aid to understanding the motivations, strategies, strengths and weaknesses of companies when identifying potential alliance partners. It may also throw light on different vendor's competitive strategies. Exhibit V-2 provides an analysis of SI vendors by core business category and gives some examples of vendors in each segment.

EXHIBIT V-2

Systems Integration Vendors Categorised by Core Business

Core Business Category	Examples
Computer Equipment Vendors	Bull, Digital, IBM, ICL, SNI, Unisys
Telecommunications Equipment Vendors	Alcatel, Racal, Siemens, Philips
Professional Services - Management Consultancy	Andersen Consulting, Coopers & Lybrand Deloitte, Price Waterhouse
Professional Services - Software Development	Cap Gemini Sogeti, Sema Group
Systems Operations	EDS, Debis Systemhaus
Engineering Products Companies	GEC, Siemens, Thompson, TRW, Philips
Network Services Vendors	GE Information Services
Telecommunications Services Operators	AT&T, British Telecom, Cable & Wireless, DBP Telekom, France Telecom

Most vendors focus their marketing on existing markets to protect and expand their existing coverage. They look for partners, team-mates or acquisitions in skill areas or markets where they lack understanding or customer contacts.

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Some vendors with extremely large customer bases, such as hardware or telecommunications vendors, recognise SI as a threat to account control. They seek partners or acquisitions to assist in protecting their exisiting business. Examples of some vendor class strategies to expand SI capabilities are identified in Exhibit V-3 and discussed below.

Equipment vendors have developed strong alliances, to augment dedicated in-house staffs, and to add software products and professional services (including business consulting). These moves allow them to offer a full range of support services. IBM and Digital are involved in such alliances. Vendors have also added systems operations to their offerings during 1990 as well, and are using alliances to supplement internal systems operations resources. Systems operations firms recognise SI as a vehicle for building systems for clients that they can later convert into long-term systems operations contracts. Communications firms are adding both software and professional services to expand network services into full-scale systems integration capabilities.

The majority of vendors who aim to be prime contractors in systems integration are looking to retain the project management and system specification work for their own staff, since these are identified as highly profitable activities. Most would-be prime contractors are also building up their systems development capabilities.

The professional services vendors and management consultancies tend to have very strong in-house professional services capabilities, whereas the equipment vendors are building up these capabilities but at the present time remain dependent on third parties for particular niche skills.

The use of business consultancy as a precursor to the identification of IS strategies, and hence systems integration projects, within large organisations is becoming one of the critical success factors in the systems integration market. The combination of business consultancy and strategic IS consulting is also seen as a rapidly growing market in its own right. It is an area of traditional weakness for the professional services vendors and so these vendors are now starting to attach considerable importance to developing partnerships with the key management consultancies. CGS, which is strongly targeting systems integration has, for example, recently acquired majority stakes in consultancies United Research and Gamma International.

The equipment vendors such as IBM and Digital have been using their internal functional experts in areas such as manufacturing and logistics as consultants. These experts have been involved in management workshops with users to assist them in identifying the organisation's critical success factors and the information systems projects which arise in consequence. However, while this approach has been well received by user information systems management, it may still lack credibility

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compared to the major management consultancies at board level. Accordingly, partnerships with the key consultancies are increasingly being seen as essential for business development, and a joint venture between IBM and Coopers & Lybrand has recently been announced in the US. Initially the company will provide management consulting services for leading consumer package goods, pharmaceuticals and health-care supplies companies. In the medium term, it is planned that the company will advise on computer-integrated manufacturing and develop into the aerospace, defence and automotive sectors.

EXHIBIT V-3

Emerging Alliance Strategies

Core Business Category	Required Additional Capabilities	Strategic Objectives
Computer Equipment	Software Development Software Products Systems Operations	Full Range Services
Telecommunications Equipment Vendors	Software Development	Network SI
Professional Services - Management Consultancy	Software Development Software Products Network Services Systems Operations	Full Range Services
Professional Services - Software Development	Software Products Management Consultancy Systems Operations Network Services	Full Range Services
Systems Operations	Professional Services	Systems Operations
Engineering Products Companies	Professional Services	Support Core Business
Network Services Vendors	Professional Services	Network Services
Telecommunications Service Operators	Software Development	Network SI

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It is not clear how successful these actions will be in expanding market share. For some vendors, the addition of new capabilities and entry into new markets represents a real challenge to traditional cultures. Some vendors have already recognised that they are better serviced by leveraging their internal skills and products rather than attempting to provide a large number of services and products that are not synergistic with their core businesses. So, while many of these actions may fail, most vendors recognise that they must participate in SI to protect their core information services business and customer bases.

In developing alliances vendors must have identified partners at as early a stage as possible in the bidding process, preferably well before the formal process begins. Strong alliances will construct a winning bid through the unique combination of the partners' specialised skills and capabilities.

However, vendors need to be aware of the potential downsides in alliances. The problems that can contribute to the failure of alliances have been much studied by business schools. Exhibit V-6 lists the key problems identified by a UCLA study of the subject in the United States.

The problems that contribute to the failure of alliances can occur quickly if adequate planning and execution of the agreement do not occur. Benefits and key asset sharing are quoted most frequently as reasons for alliance failure. Differences in business culture are also problems, but may take some time to become fatal.

Because of these potential problems and because of the need for early involvement and the speed with which opportunities arise, it is necessary for vendors to establish alliance agreements that cover future contracting opportunities. These agreements detail how the two parties will work together when an opportunity does arise. Basic terms and conditions are defined and pre-agreed upon so that when an opportunity arises the alliance can be engaged immediately.

Once the alliance is engaged, the avoidance steps can prevent the type of distrust that fails to make the alliance a winning combination. Clearly written objectives in the hands of key managers, and open communication appear to be the most effective tools. But alliances are rarely intended to last long.

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EXHIBIT V-4

Problems of Vendor Alliances

- Problems
  - Impact of environmental forces
  - Short-term differences in performance
  - Perceived versus actual benefits
  - Unwillingness to share key assets
  - Difference in business culture
- Steps to minimise failures
  - Clearly determine common objectives
  - Communicate strategy to operating people
  - Avoid complexity
  - Insulate alliances from partners

The need for subcontractors was raised earlier in this section in reference to Exhibit V-3. Using subcontractors is an alternative strategy for gaining access to specialised skills or resources that a prime contractor does not have available in-house for meeting SI contracting commitments. Working with a smaller company as a subcontractor could well be a better strategy than having to work in some form of alliance with an eventual competitor. Exhibit V-5 summarises the principal characteristics of potential subcontractors for SI projects.

Most smaller vendors will have a narrow, specialised range of technical skills and these will often be based upon their own software product application solution. Further they are unlikely to have any large-scale project management experience and will tend to lack the financial resources to carry out fixed price contracts of any scale. They probably do not want to be the prime contractor for projects but view the developing SI market as an opportunity for subcontracting.

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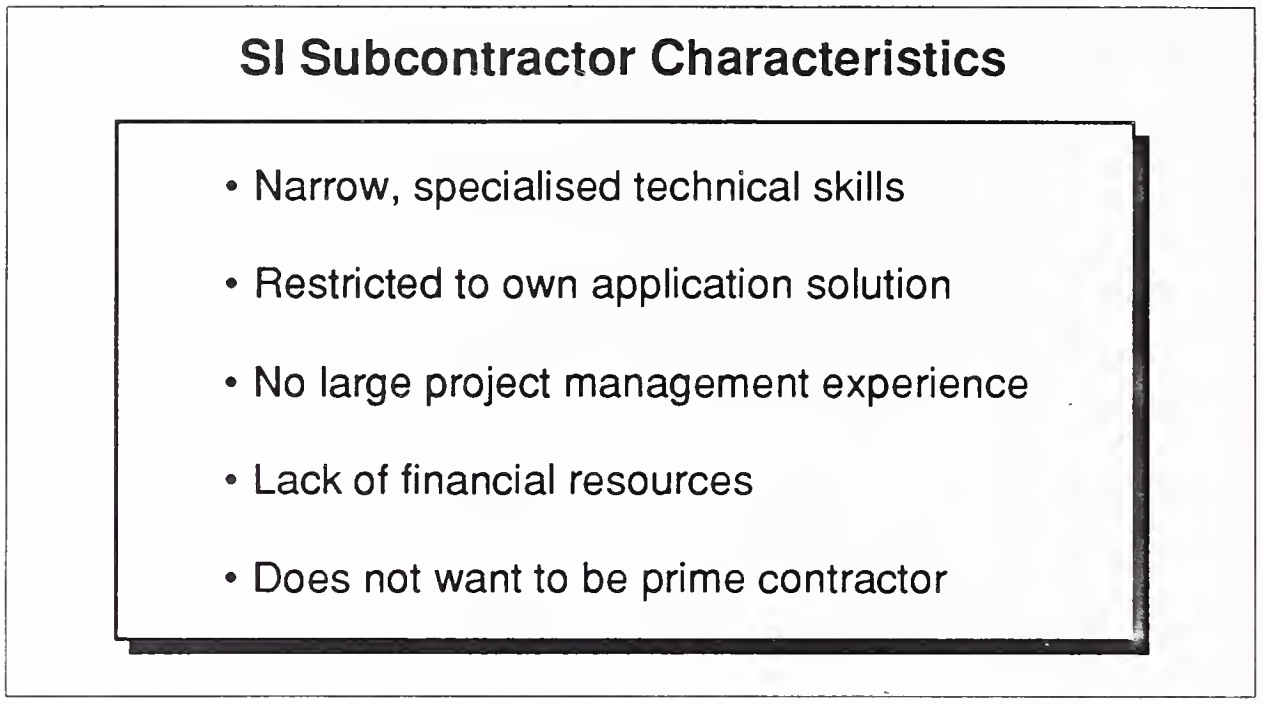
EXHIBIT V-5



B

Types of Agreement

Exhibit V-6 shows the pattern of agreements taking place between contractors and their partners.

In practice, most partnerships begin as one-off agreements to tackle a particular project, and develop in line with project performance and the pattern of future work. Even in one-off projects, it can be useful for the partners concerned to have a formal written agreement. This can be used to prevent subcontractors from joining a number of consortia bidding for the same project, and to prevent the prime contractor from offering the client a choice of subcontractors for a given task.

It is generally inappropriate to try to establish agreements with potential partners before targeting projects where they would be required. It takes considerable time and effort to establish partnerships and these will quickly dissolve if no suitable projects arise. Even where companies have worked together on a systems integration project, if no similar projects arise thereafter then the relationship will not develop further.

However, a prime contractor will typically become expert in particular types of systems integration project and generate repeat business. Then once a prime contractor has worked with a partner on a number of occasions, the relationship will become more firmly established. At this stage, heads of agreement between the two companies will often be signed. These heads of agreement are often equivalent to letters of intent for the two parties to work together in particular circumstances. In some cases, and this particularly applies to the lower levels of systems development work, agreements may incorporate business level guarantees. Many vendors are reluctant to do this however.

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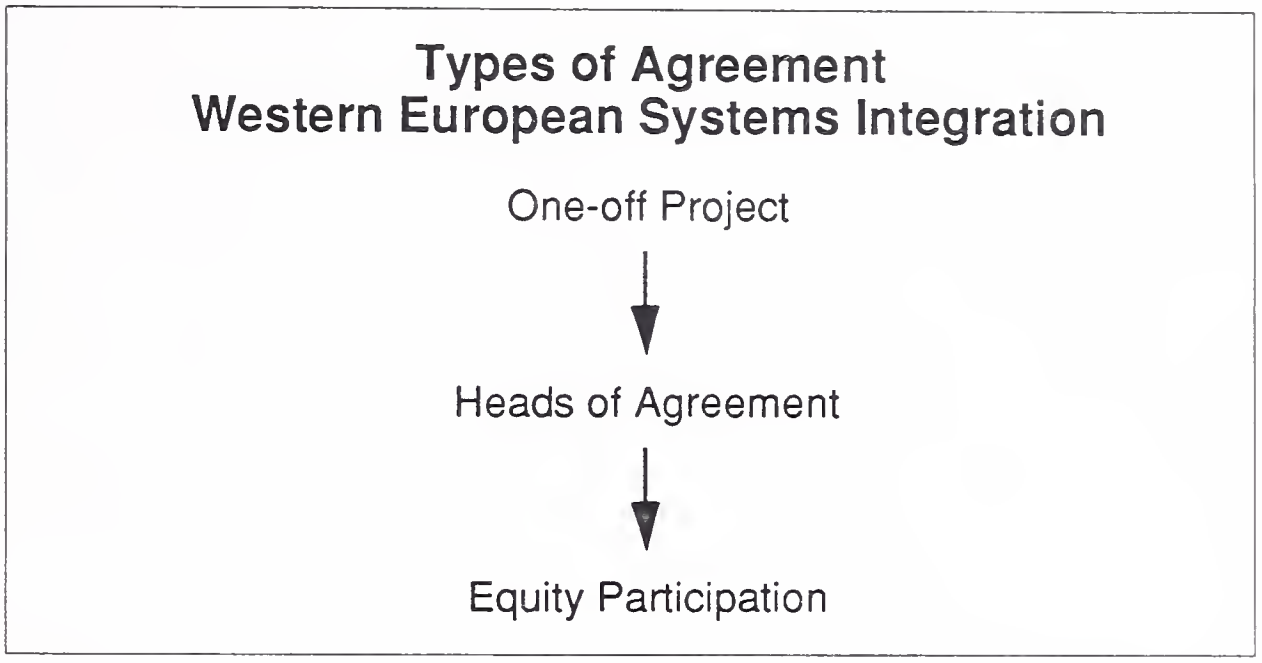
EXHIBIT V-6



At this stage, the prime contractor may also start to expect its major partners to contribute to business development by identifying prospects for systems integration projects. Despite this, many vendors are concerned that they preserve their appearance of impartiality in partner selection in the eyes of their customers.

Consortia building, or access to key partners, is seen as a critical success factor by many systems integration vendors. This can lead to competition for certain key players and the desire to lock them in to particular relationships. While heads of agreement can be used as lock-in mechanism to a certain extent, equity participation is more effective and, after its adoption by IBM, is likely to increase in use over the next few years. In time, this may lead to formal mergers between vendors. The drawbacks of equity participation are that it prejudices the prime contractor's perceived impartiality in choice of partner, and its effects on cash flow. The latter is a major constraint on some equipment vendors at the present time.

Many vendors are finding they need to establish partnerships at two levels. Firstly they need global agreements with key partners to support their targeting of key sectors. Secondly, local agreements are necessary to provide niche support in response to the circumstances of particular systems integration business units.

Overall most alliances are not binding and it is not uncommon to find that vendors who were partners on one project are competitors on another. Despite this, vendors have a strong preference for using partners they have worked with previously. The main reasons for this are listed in Exhibit V-7.

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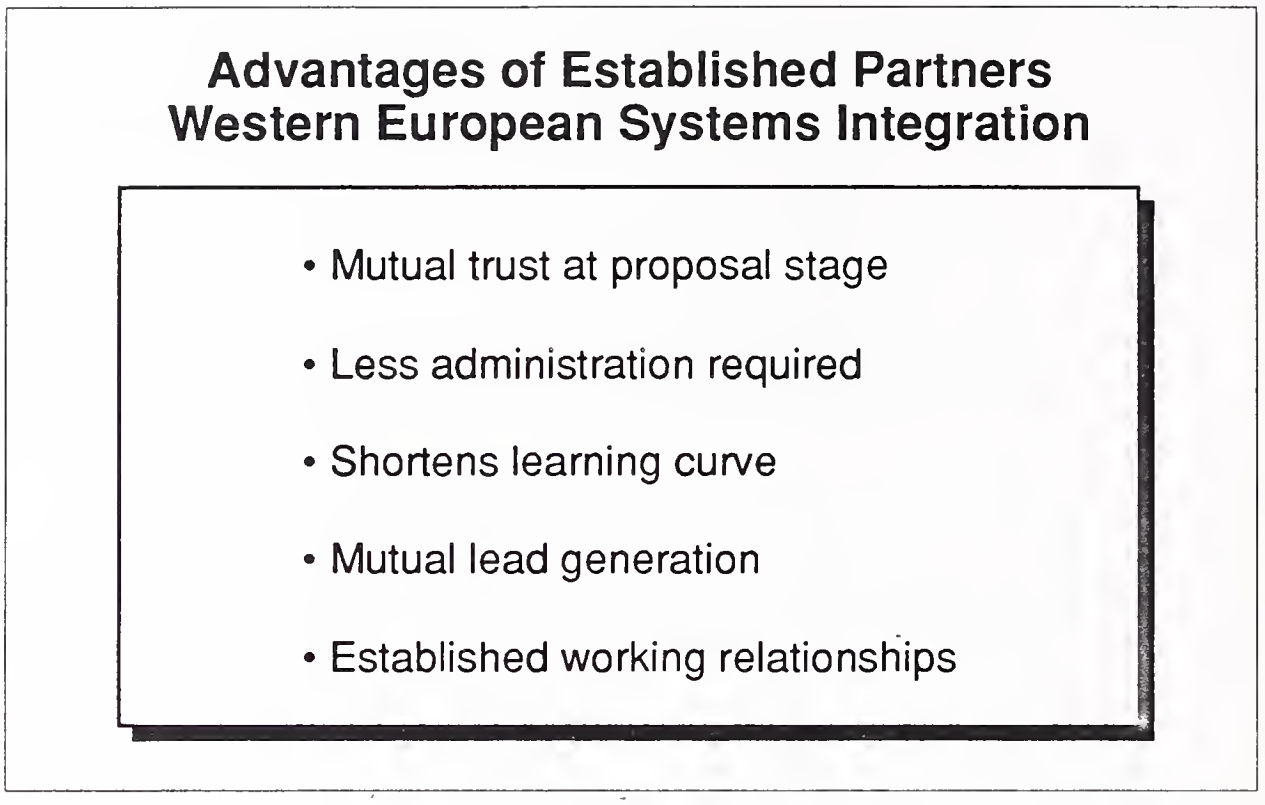
EXHIBIT V-7



Firstly, there needs to be a high level of mutual trust at the proposal state and a common belief amongst all partners that a fair apportionment of risk and reward has been achieved. Partners also need to share a conviction that the proposal is a worthwhile risk, and that the contract can be won. Partners leaving the consortium part way through a bid can be a major problem for prime contractors. It is also very undesirable for partners to reduce their risks by joining a number of consortia bidding for the same contract.

Secondly, using known partners can lead to a considerable reduction in administration. This is particularly true if the prime contractor has a rigorous set of procurement rules making the evaluation of the commercial standing of potential new partners an onerous task. Furthermore if the organisations concerned have already drawn up heads of agreement concerning their business relationship, then much less negotiation may be required before work on the proposal can begin. At the systems development stage, then familiarity with each other's business practices reduces risks of misunderstanding and increases the likelihood of project success. In some cases, greater familiarity between partners is even enhanced by mutual training and education.

Overall, the relationships between the prime contractor and its partners are nearly as important as that between the client and the prime contractor in ensuring the success of a project. Because of this and the amount of time and effort required to develop a successful partnership, a number of prime contractors are concentrating their efforts on developing relationships with a small number of key partners. This has significant advantages in gaining access to critical skill areas, shortening project learning curves, and eventually mutual lead generation.

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C

Major Trends

Exhibit V-8 lists the major trends in the development of partnerships in the systems integration market.

Firstly, the majority of vendors aiming to become major prime contractors see business consultancy as the key means of business generation. Accordingly while a number of vendors are developing their links with the major management consultancies, other vendors have been more active in terms of acquisitions and joint ventures. For example, CGS has acquitted majority stakes in Gamma and United Research while IBM, after initially trying to use its own internal experts in this role, has now established a joint venture company with Coopers & Lybrand in the U.S. Change management is another critical area in which vendors need access to experienced personnel.

Secondly, as vendors identify those partnerships which will be critical to their future success, so these links are being strengthened. Initially heads of agreement are used but there is an increasing trend towards equity participation. This trend also means that prime contractors and their key partners are starting to generate repeat business and work together on a number of similar projects.

However, in spite of this, it can be important for partners—especially consultants and prime contractors—to maintain the appearance of independence in front of their clients.

EXHIBIT V-8

Major Trends in Collaboration
Western European Systems Integration

- Access to business consultants vital
- Key partnerships becoming contractual
- Repeat business
- Apparent independence of partners

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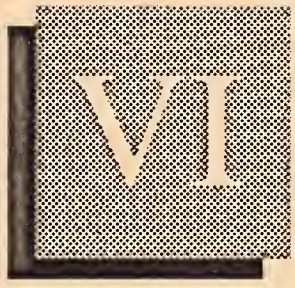
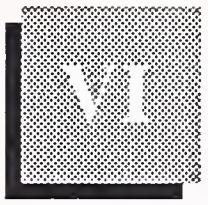


Vendor Strategies



Vendor Strategies

A Vendor Objectives

The real growth of the professional services sector has been reduced by recent downturns in IS spending growth generally. The market is also becoming more competitive. Its relatively high growth rate is still attracting a wide range of vendors into the market who have not previously treated it as a main line of business:

- Equipment vendors that are looking for greater account control and more margin contribution as hardware prices fall.

- Management consultancies that are seeing the IT proportion of their business grow much more rapidly than any other sector.

- Software product companies that are introducing professional services in order to develop more major account business and ensure customer loyalty in the longer term.

- Telecommunications vendors that are developing similar strategies to spread their influence in the market.

- Staff agencies that have thrived on the continued difficulties of recruiting and retaining good IS staff.

As competition among professional services vendors has increased so has it become more important for vendors to have a clear position in the market. Systems integration contracting has been one very clear and very dramatic response to that market-driven need.

In particular, professional services vendors positioning themselves as systems integration contractors have met considerable competition from management consultancies, the major equipment manufacturers and the larger software product vendors. This mix of competitive and market

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forces is causing vendors to identify and target some important objectives; they are listed in Exhibit VI-1.

One of the most important is that of addressing the problem of how to remain competitive by improving productivity and performance. Vendors will probably need to maximise the use of new tools and methodologies in order to remain competitive in terms of quality, cost and completion timescales.

Vendors are building and marketing proprietary products and methodologies. Solid methodologies for requirements analysis, system design, programme management and integration, and implementation improve the odds for programme success and reduce the risk of catastrophic failure. The methodologies also build a record of success that can be used for reference selling. Additionally, framework products continue to be developed that can be tailored to satisfy a client's specific business needs.

Vendors are also targeting a full-service positioning in the market through an expansion of their portfolio of services; this is particularly apparent in the areas of strategic consulting, management consulting and systems operations.

The development of specialised industry sector knowledge is also an important objective of many vendors in order to maintain existing customer relationships.

Vendors recognise the importance of understanding the client's business, particularly in an environment where long-term relationships are important. To achieve this goal, vendors are making significant investments in industry architectures and solutions, hiring industry experts, and establishing alliances with consulting firms or professional services firms that already have industry expertise.

Clearly this is also an opportunity for the smaller vendors to maintain and develop their specialised niche skills in order to be attractive to the larger vendor seeking an alliance. Many of these companies may have products that were previously sold as standalone systems but can form the basis of the integration of a larger solution. An example of these sorts of products would be warehouse storage and retrieval systems. Another class of candidate would include those vendors who have developed solution products and want to market them to a wider base of prospects.

Partnerships are a response to the high investment needs and risks associated with systems integration contracts. There are many successful examples of both strategies in Europe, as well as failures. Moving upmarket and gaining entry through a management consultancy to boardrooms of potential new clients is one of the most attractive options.

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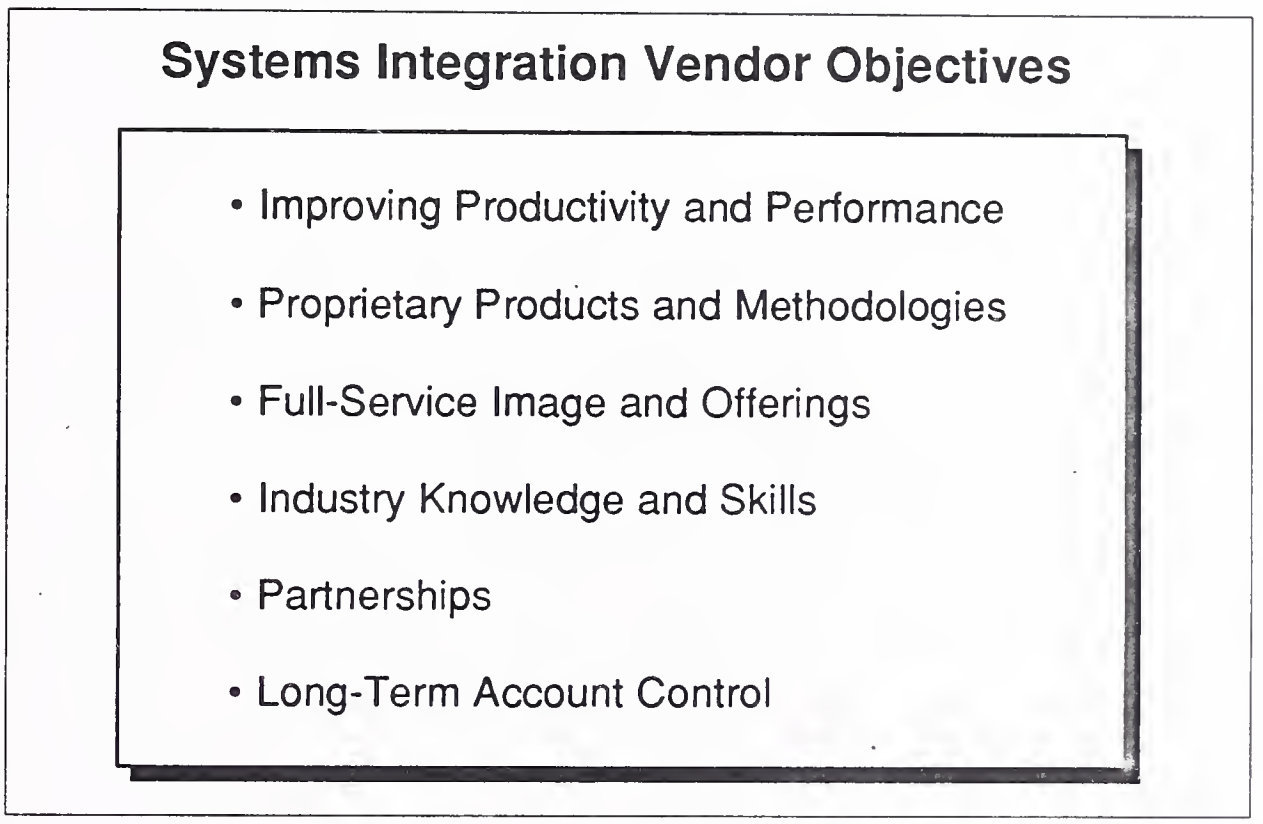
However, it appears that moving in the opposite direction—diversifying down the demand chain from consultancy to software development and implementation—is the more successful manoeuvre at present.

Finally an important objective for many vendors is to establish long-term account control. Systems integration is a very high level distribution channel for the complete range of computer and telecommunications products and services.

EXHIBIT VI-1



In effect, it provides or limits product access to some of the largest users. Consequently vendors that do not have access to this channel risk losing market share through losing direct contact with existing customers.

The information industry has evolved from a product to a services orientation and from an environment where the customer was totally responsible for implementation to one where vendors are beginning to assume these responsibilities. Customers are seeking one-stop shopping and vendors are starting to add additional products and services to become full-service providers. User organisations are clearly looking outside for a single point of responsibility.

B

Vendor Targeting

While the business pressures impacting on users are the major driving force behind the adoption of systems integration projects, technological capability remains an important factor in determining the manner in which IS support to the business can be achieved.

Vendor targeting of the systems integration market reflects these two driving forces. Examples of vendor targeting are shown in Exhibit VI-2.

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EXHIBIT VI-2

Vendor Targeting
Systems Integration, Western Europe

- Major organisations
- Industries undergoing radical change
- Companies with highly distributed operations

Some vendors place the emphasis on identifying and providing business solutions to top management, while others concentrate on providing the technological infrastructure to facilitate the linkage of heterogeneous equipment and company wide sharing of information.

Industry expertise is a key attribute in delivering business solutions, and one approach adopted by vendors is to target large companies in particular sectors. Industries which are undergoing radical change or face severe competitive pressures are especially suitable targets for systems integration vendors. Examples of such sectors are the manufacturing and banking and finance industries. Within the manufacturing sector, IBM and Digital have used their internal manufacturing experts in the role of consultants to demonstrate the vendor's industry knowledge and expertise. However, IBM's recent joint venture with Coopers & Lybrand suggests that this approach may not have been a complete success.

Established long-term relationships between client and vendor are an important factor in developing the client confidence required to generate systems integration business. With this in mind, some vendors target a small number of major organisations and put a lot of effort into developing their relationship with the potential client.

Other vendors who see network integration as their key strength specifically target users with large numbers of sites, particularly multinationals with widespread operations throughout Europe.

The major sales channels used by vendors to acquire systems integration business are listed in order of importance in Exhibit VI-3.

Account managers play the most important role, and in recognition of this the equipment vendors are upgrading the calibre of their account managers in their major customers and improving the level of business consultancy support provided to them.

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It is widely recognised that the role of external consultants is increasing in importance. This is particularly true of their use for Initiation to Tender preparation and vendor selection assistance. However, it is also likely that the consultancies will increase their significance as prime contractors in the systems integration market over the next few years.

Accordingly, a number of vendors, both equipment vendors and professional services vendors, see management consultancy as the key to the systems integration market. However, it can be difficult for vendors to establish firm partnerships with the existing major consultancies since the latter are much in demand, keen to retain their independence, and will tend to work solely with the key suppliers to each industry sector.

In spite of this, it is important for vendors to develop their relationships with the consultancies, both to develop mutual confidence and to ensure awareness of their areas of distinctive competence.

EXHIBIT VI-3

Sales Channels
Systems Integration, Western Europe

- Account Managers
- New Business Sales Personnel
- External Consultants
- Third Parties

However, because it is difficult for vendors to exercise their influence over independent consultancies, a number of vendors, such as CGS and IBM, are either acquiring or forming joint ventures with consultancies to gain comparatively tied access to these skills.

When asked how important certain personnel are in the buying process for systems integration projects, vendors' replies were equally divided between those regarding client board-level personnel as most important and those regarding the head of information systems as the most important.

Obviously, the management consultancies tend to operate at board level, and are frequently unconcerned about their impact on IS management, which they may see as a rival supplier of services.

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The situation is less polarised for the equipment vendors and professional services vendors. While some of these vendors are clearly targeting board-level personnel, it is unlikely that they can afford to alienate their traditional buyers amongst IS management. Once they become perceived as a threat, they risk putting their traditional business within the account in danger unless they take the radical step of introducing complete systems operations into the organisation.

Ideally, many of these vendors need to encourage a co-operative, tripartite approach to the business problem involving user top management, IS management , and themselves. One way to do this may be to encourage and assist IS management in taking a more proactive, business-oriented approach.

Other equipment and professional services vendors continue to work most closely with IS management and have a high degree of dependence on IS management's influence within the user organisation.

Some of the overall trends in the targeting of the systems integration market are listed in Exhibit VI-4. Firstly, as discussed earlier, there is the growing importance of strategic business consultancy, and the management consultancies, in the buying process.

EXHIBIT VI-4

Strategic Trends
Systems Integration, Western Europe

- Business consultancy
- Formation of long-term consortia
- Importance of product branding
- Open systems as competitive weapon
- Need for key partners

Secondly, as the systems integration market matures, vendors will increasingly form comparatively fixed consortia to tackle particular industries or types of solution. Most vendors prefer to work with partners they have used previously, and so, as vendors become more experienced in working together, groups of companies with established, complementary skills in particular markets will tend to work together more and more frequently. This may make it increasingly difficult for

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other vendors to establish themselves. Accordingly it is important for vendors to concentrate on developing a small number of key partnerships. One example of this approach is IBM's Authorised Industrial Systems Integrator programme, which provides key partners with an appreciable level of support and strengthens their links to IBM.

Application software products are often key building blocks in systems integration projects. There are signs that product branding is increasing in importance. Branding may be especially important in the open systems market. Vendors will need to ensure that not only can they provide a particular application but also that they have access to, and experience in, the market-leading products.

A number of vendors see open systems as a major opportunity to penetrate new accounts, particular those which were previously closed to them because of IBM or Digital purchasing policies.

Another positioning criterion in the systems integration market is the vendors' level of independence from partners. Some vendors, such as Digital and CGS are positioning themselves as having high levels of impartiality while for example, IBM has a comparatively low level of independence.

C

Vendor Strengths and Weaknesses

The major strengths and weaknesses of the equipment vendors in the systems integration market are listed in Exhibit VI-5.

The equipment vendors have good account management skills and are perceived as having a greater degree of financial stability than many of the smaller professional services and applications software product vendors. This can lead to their being asked to take over prime contractorship for projects identified by partners who lack the credibility for this role.

However, the equipment vendors typically lack true business consultancy skills which can limit their access to, and credibility with, top management. Some vendors are attempting to cover this weakness by acquisition or joint ventures and strengthening their links with management consultancies. There are some dangers in this approach since while management consultancies can afford to develop relationships solely with user top management, the equipment vendor cannot afford to alienate IS management.

Many equipment vendors lack the resources for software implementation and development and so subcontract these elements to professional services vendors.

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The typical strengths and weaknesses of the professional services vendors are listed in Exhibit VI-6.

EXHIBIT VI-5

Equipment Vendors
Strengths and Weaknesses
Systems Integration, Western Europe

Strengths	Weaknesses
Account management	Business consulting skills
Financial solidity	Cannot afford to alienate IS management
	Lack of development expertise/resources

EXHIBIT VI-6

Professional Services Vendors,
Strengths and Weaknesses
Systems Integration, Western Europe

Strengths	Weaknesses
Relationship with IS management	Business consulting skills
Project management skills	Lack of access to user top management
Implementation/technical skills	

The major strengths of the professional services vendors are their relationships with user IS management and their expertise in large information systems development projects. This means that they are well positioned to act as prime contractor on systems integration projects initiated by user IS management, and well positioned to act as professional services subcontractors to both equipment vendors and user IS teams.

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Their traditional weaknesses lie in their lack of strategic consultancy skills and their lack of influence with user top management. Though some vendors are endeavouring to rectify these weaknesses, doing so may pose a threat to their traditional business areas.

Exhibit VI-7 lists the major strengths and weaknesses of the management consultancies.

EXHIBIT VI-7

Management Consultancies
Strengths and Weaknesses
Systems Integration, Western Europe

Strengths	Weaknesses
Business consultancy skills management Access to user top management	Poor relationship with IS

The management consultancies have the business consulting credibility necessary to gain access to user top management, and their significance as prime contractors in systems integration projects is likely to increase over the next few years.

However, many IS departments feel threatened by these consultancies, and this could be a long-term weakness if IS management succeeds in becoming more business oriented and strengthening its role in vendor procurement and management for systems integration projects.

D

Future Strategies

The development of the systems integration market in Western Europe is likely to experience significant changes as vendors vie to achieve critical market position. These changes are currently being exacerbated by difficult economic and business conditions in a number of country markets within Western Europe.

The fundamental driving force for these changes is client need and client demand for increasing external involvement in the provision of IS services, a phenomenon popularly referred to as outsourcing. The driving forces for outsourcing in general were discussed in Chapter III. The rationale for the particular intensity with which outsourcing, not a new phenomenon in itself, is now being debated within the industry can

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clearly be attributed to the increasing complexity of information systems and the applications that run on them. The complexity drives the requirement for specialist technical and management skills to develop and operate them. One particular aspect is the increasing difficulty of managing numerous small subcontractors to support IS development and operations managed internally, for two reasons:

- The perennial problem of a high death rate amongst small subcontractors.

- The difficulty of building up the ongoing repository of know-how and experience with such companies.

Particular emphasis needs to be placed on management skills since what is so often lacking is the capability to span both the business needs and objectives with the technical requirements. Most significantly this management need can only be outsourced through the development of a long-term continuous relationship between the vendor and the client. In-depth knowledge of the relevant industry sector's operational environment, and of the client firm in particular, can only be developed and maintained by means of a close and long-term commitment on the part of the vendor and the client. The development of such a partnership relationship creates the necessary conditions for the establishment of a repository of client systems knowledge and experience within the vendor. Without that knowledge the vendor cannot successfully meet the increasingly complex needs of the client.

Not only does the complexity of advanced information systems and their applications require the building of long term client/vendor relationships, it also broadens the scope of services that the client may wish to buy from the systems and services vendor. The most obvious additional requirement is that for management consultancy in addition to information technology and systems consultancy. There is strong evidence of vendors responding to that need. Exhibit VI-8 provides some key examples of the emerging congruence between information systems services and management consultancy. Additionally of course, organisations like Andersen Consulting have developed out of management consultancy into information systems and services rather than the other way around.

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EXHIBIT VI-8

Examples of Information Systems Services and Management Consultancy Congruence

- IBM's development of a strategic consultancy capability and the formation of Meritus Consulting Services with Coopers & Lybrand Deloitte.
- Cap Gemini Sogeti's investments in management consultancy firms:
  - United Research
  - Gamma SA
  - MAC Group
- Computer Sciences Corporation's acquisition of the Index Group.
- McKinsey's acquisition of the Information Consulting Group from Saatchi and Saatchi.
- Booz, Allen and Hamilton's formation of an information systems group.
- PA Consulting Groups' acquisition of Pugh-Roberts Associates, a U.S. based high-technology strategic consultancy.

The greater the integration of the information systems function into the operational organisation, the greater is likely to be the need for this convergence of strategic management consultancy and information technology consultancy. The sheer complexity of large scale information systems is further driving user need for the initial consultancy services to be followed by development and implementation and even operations support from the same services vendor.

Thus there exist in the market signposts pointing towards the emergence of a group of software and services vendors who will have achieved a critical market position. This critical market position will be distinguished by their ability to provide strategic management consultancy, information technology consultancy, systems development and implementation services and operational services through a strong client outsourcing relationship.

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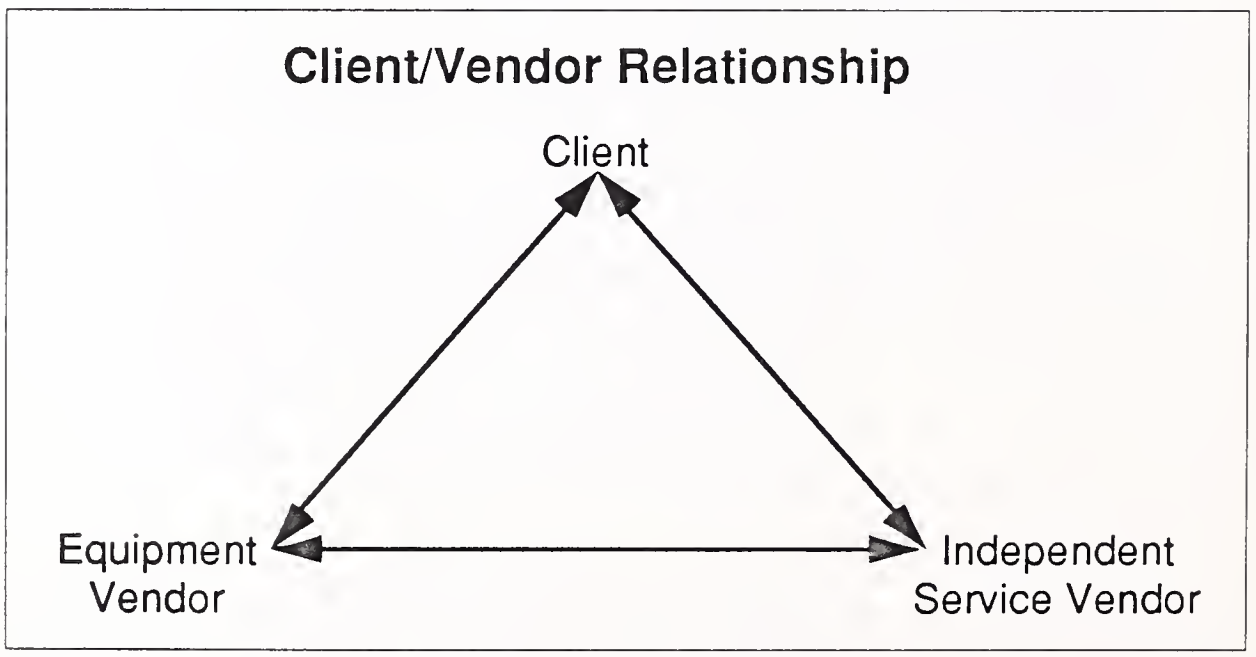
However, it is clearly not just independent software and services companies that are vying for this critical market positioning. The leading equipment vendors and telecommunications companies are also candidates. In Western Europe Siemens Nixdorf Informationsysteme, Groupe Bull, ICL and of course IBM are examples of companies positioning themselves for these opportunities. IBM in particular has created numerous alliances and relationships to assist its drive into system management services. Group Bull has adopted a partnership approach to the SI market, developing relationships in Europe with amongst others, Andersen Consulting, Cap Gemini Sogeti, Logica and British Telecom.

In Europe it is largely the U.S. telecommunication companies that have made strategic positioning moves towards providing full systems management services. Examples are AT&T, through its acquisition of Istel in the United Kingdom and its emerging acquisition programme in continental Europe, and NYNEX with its purchase of BIS. The indigenous country telecommunications, for example DBP Telekom and France Telecom, are also candidates by virtue of their size, but their national heritage many limit them from genuinely developing a pan-European or global capability for a full range of information systems services. Companies like GE Information Systems and Cable and Wireless may also be able to position themselves in this market.

For major clients the attractions of building long-term "partnerships" with their full-service supplier is leading to the emergence of a new buying paradigm, the principle of which is indicated by Exhibit VI-9. The traditional strong, but clearly limited relationship, between the client and the equipment vendor is being pried apart with the emergence of major independent service vendors attaining at least equal status in a *menage a trois*.

EXHIBIT VI-9



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In many situations the client, aware of the lock-in to a particular equipment vendor, is anxious to have the guidance of a *full-service* independent firm that can, in effect, act as an umpire for strategic platform and system architecture decisions.

The emergence of this new buying approach will present a channel control problem to equipment vendors, potentially cutting off the direct interface to the client in some situations. The general move in the industry towards emphasis on applications (services) rather than equipment (products) is increasingly placing equipment vendors in commodity markets as channel control is lost. Commodity markets are dominated by the lowest cost producers or those vendors with an excellent or unique product strategy.

A further observation that can be made with regard to this emerging buying paradigm is a distinction between prime contractors and subcontractors. A considerable quantity of intra-industry business is already done in this way and as this extends, software and services vendors will be polarised more clearly into prime and subcontractor roles. Some key factors that prime contractor aspirants must adopt are:

- Image, reputation and capability to offer strategic management consultancy services.
- The financial strength and international presence to provide the necessary knowledge/experience repository on an ongoing basis for the client.
- Investment in key internal management technologies:
  - Quality systems
  - Software engineering systems and methodologies.
- Human resource management capabilities, particularly the development of project and business programme managers.

Finally in considering the question of image and reputation in the market, it is important to remember that a question of scale is involved. At the $2 M project level price, is the key parameter; at the $20 M project level and above, the importance of the price in the view of the client is generally overtaken by such considerations as image and reputation.

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E

Vendor Challenges

Exhibit VI-10 lists the main challenges for vendors in the Western European systems integration market.

The major challenge for many vendors is gaining access to the key decision makers within the user organisation. Most systems integration projects are being driven by top management taking a business, not a technological, perspective. This calls for an approach based on business consultancy and thorough understanding of the client's industry rather than IS consultancy, and the traditional IS sales person is not well-suited to this task. One of the key success factors in winning systems integration business, as expressed by one vendor, is:

"Getting as high in the company as quickly as possible"

Vendors are responding in a number of ways. Firstly, many vendors recognise the important role being played by the management consultancies and are endeavouring to strengthen their relationships with the key players. Some vendors such as CGS and IBM have either acquired or formed joint ventures with consultancies.

EXHIBIT VI-10

Vendor Challenges
Systems Integration, Western Europe

- Access to key decision makers
- Client understanding of requirements
- Managing organisational change
- Building key partnerships
- Profitability

Secondly, the hardware vendors such as Digital and IBM are strengthening their account management using their most senior sales management personnel. They are also using their own internal functional specialists as consultants to advise clients on business issues. Management workshops are being held with user management to assist them in identifying their company's critical success factors and the support which information systems can provide.

Once a systems integration project is seen as desirable by a client, the single most important risk factor is the client's level of understanding of his requirements. There are many examples of projects which are techni-

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cal successes but commercial failures. To avoid this, the vendor must check the commercial logic of the proposed system and its ability to meet the client's business objectives. Human and organisational issues within the user organisation must also be considered. The management of change is an important part of systems integration projects. The automation of existing procedures is comparatively low risk. However, systems integration projects are frequently concerned with initiating considerable procedural and structural change. This introduces a much higher level of risk unless the organisational issues are adequately addressed alongside the technological issues.

Another key challenge for vendors is the ability to develop long-term partnerships to cover the needs of their chosen markets. Many vendors are approaching the systems integration market by focusing on a number of key vertical markets. It is crucial that vendors can put together strong teams to cover these markets. This involves filling the gaps in their own expertise by developing long-term relationships with other key players in the same sector.

For example, IBM has appointed a number of authorised industrial systems integrators to assist in serving the manufacturing sector. These companies are each recognised as being very strong in their own fields, and are being cultivated by IBM. Some of the support provided by IBM is listed in Exhibit VI-11.

It is important for vendors to have access to the key complementary players in their chosen markets. Ideally partners should be well known in their own fields. Stability of relationships with partners is also important since this leads to more effective and efficient working relationships in the long run.

EXHIBIT VI-11

IBM Authorised Industrial Systems Integrator Programme

- Leads generated by IBM
- Free use of IBM demonstration facilities
- Free induction training
- Free pre-sales support
- Equipment discounts

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Another major challenge for vendors within the systems integration market is to maintain profitability on a project-by-project basis. This is notoriously difficult to achieve.

Exhibit VI-12 lists some of the factors which can have an important impact on project profitability.

Firstly, it is important for vendors to be selective in the projects for which they bid, and vendors typically aim to win one in three. This in turn implies a significant degree of specialisation by the vendor.

Secondly, it is important for vendors to have a strong risk management methodology. This should identify all the possible areas of risk and their associated outcomes, together with the profitability and financial implications of each alternative outcome. Such an assessment can be used both for internal risk assessment and risk premium pricing, and also as a means of sharing risk with the client. If the risks associated with a project are fully explained to the client then the client can be asked to choose between high- and low-risk alternatives. If clients still choose high-risk alternative, then they can be asked to share, or even take full responsibility for, the financial penalties which might be incurred.

Exposing the project risk to clients before work commences is also an important factor in managing customer expectations. An approach to the problem, should it occur, can then be agreed with the customer in advance. However, it is also important to have a good relationship with the client at a senior level so that any problems or delays which arise can be openly discussed. Some vendors use senior personnel in this role to liaise with the client and reduce the pressure from the client on systems development staff.

Ensuring that change management procedures are followed is obviously key to profitability where systems development is being conducted on a fixed price basis.

Another challenge for vendors is in charging for pre-sales consultancy. The management consultancies are less likely to suffer from this problem, but many users have become accustomed to equipment vendors carrying out evaluations on their behalf free of charge. This particularly applies to areas such as technical consultancy. For example, the implementation of open systems networks is an area where clients may expect free advice. With no guarantee of getting the contract and hardware margins falling, users' expectations need to be changed.

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EXHIBIT VI-12

Influences on Profitability
Systems Integration, Western Europe

- Selective bidding
- Risk management/sharing
- Managing expectations
- Changing for pre-sales consultancy
- Change management

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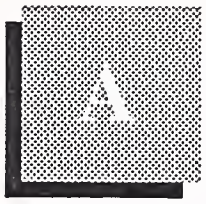
Appendix



Systems Integration Vendor Questionnaire

A. Reasons for Adoption

1. What are the principal reasons why companies are turning to systems integration?

2. What are the key benefits users expect to derive from systems integration?

3. Do you target particular industries or application areas for systems integration projects?

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4. What do you believe is your best approach for generating systems integration business?

B. Buying Process

5. Who are the key user personnel involved in the buying process? What are their roles?

6. Who are the key vendor personnel involved in the buying process? What are their roles?

7. What criteria do you use to decide whether or not to bid for a particular project? Who is involved in this decision process?

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8. What proportion of proposals do you expect to win?

C. Collaboration

9. In what proportion of projects do you manage subcontractors?

10. What are the typical roles of these subcontractors?

11. Do you have any collaborative arrangements with third parties to assist you in the systems integration market?

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12. What is the purpose of these arrangements?

13. What is the nature of the agreement between yourselves and your collaboration partners?

D. Risk Reduction

14. What do you belive are the most frequent causes of failure of systems integration projects?

15. What steps do you take to minimise the likelihood of project failures?

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16. What steps do you take to avoid project losses?

17. What steps do you take to share risks with clients and partners?

18. What approach do you adopt for the pricing of systems integration projects?

E. Issues

21. What are the main challenges facing your company in the systems integration market over the next few years?

Thank You For Your Assistance With This Questionnaire

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1 **How important do you believe each of the following factors to be as a driving force leading to user initiation of system integration projects with external vendors?**

	Not at all Important				Very Important
Migration to open systems	1	2	3	4	5
Downsizing of systems	1	2	3	4	5
Decentralisation of information systems	1	2	3	4	5
Desire to make data more widely available	1	2	3	4	5
Development of new IS applications	1	2	3	4	5
Integration of existing applications	1	2	3	4	5
Move to integrated IS systems	1	2	3	4	5
Need to link heterogeneous equipment	1	2	3	4	5
Development of corporate networks	1	2	3	4	5
Changing role of IS department	1	2	3	4	5
Lack of in-house IS resources	1	2	3	4	5
Lack of in-house technical capability	1	2	3	4	5
Cost-cutting within IS department	1	2	3	4	5
Greater involvement of user top management	1	2	3	4	5
Realignment of IS with business objectives	1	2	3	4	5
Other	1	2	3	4	5

2 **How important are the following personnel in the buying process for systems integration projects?**

	Not at all Important				Very Important
Client board-level personnel	1	2	3	4	5
Head of information systems	1	2	3	4	5
Client middle management	1	2	3	4	5
Other	1	2	3	4	5

3 **How important are each of the following in generating leads for systems integration projects?**

	Not at all Important				Very Important
External consultants	1	2	3	4	5
Own account managers	1	2	3	4	5
New business sales force	1	2	3	4	5
Third parties	1	2	3	4	5
Management workshop involving end user management	1	2	3	4	5
Business consultancy studies or audits	1	2	3	4	5
IS strategy studies or audits	1	2	3	4	5
Other	1	2	3	4	5

4 **How frequently are each of the following extensively involved in the management of systems integration projects?**

	Very Rarely				Very Frequently
Client board-level personnel	1	2	3	4	5
Client information systems managers	1	2	3	4	5
Client middle management	1	2	3	4	5
Both IS and other top management	1	2	3	4	5
Other	1	2	3	4	5

5 **How frequently does your company carry out the following roles in systems integration projects?**

	Very Rarely				Very Frequently
Business consultancy	1	2	3	4	5
IS strategic consultancy	1	2	3	4	5
Feasibility studies	1	2	3	4	5
Functional specifications	1	2	3	4	5
Subcontractor management	1	2	3	4	5
Prime contractor	1	2	3	4	5
Project management	1	2	3	4	5
Major software development role	1	2	3	4	5
Other	1	2	3	4	5

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